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REIGN OF HIS MAJESTY KALAKAUA, 13th YEAR.

Hawaiian Islands



REPORT OF THE PRESIDENT
OF THE
BOARD OF HEALTH
TO THE
LEGISLATIVE ASSEMBLY
OF 1886,
ON LEPROSY.

L. A. B. & C.

HONOLULU, H. I.

DAILY BULLETIN STEAM PRINTING OFFICE.

1886.

i.



REPORT OF THE PRESIDENT
OF THE
BOARD OF HEALTH
TO THE
LEGISLATIVE ASSEMBLY OF 1886
ON LEPROSY.

OFFICE OF BOARD OF HEALTH,
HONOLULU, APRIL 30th, 1886.

Nobles and Representatives:

When, twenty-one years ago, (January 3, 1865,) the Legislature of this Kingdom enacted the law "to prevent the spread of Leprosy," it was provided that the Board of Health,—the Department authorized to carry out its provisions,—should report to the Legislature at each of its regular sessions, the expenditures in detail, *together with such information regarding the disease of leprosy, as well as the public health generally, as it may deem of interest to the public.*

During the twenty years and over that have elapsed since the passage of the Act referred to, and the compilation of the now famous Report of the College of Physicians of England on leprosy, obtained at the instance of Her Britannic Majesty's Government, the study of the disease, that has prevailed, and to a great extent, still prevails so virulently in this Kingdom, has been pressed with unremitting zeal and perseverance in nearly every country by men of medical and scientific attainments. By degrees, through unceasing and watchful labor, by comparison of information and in-

terchange of experiences, experiments and thought, and to no small extent perhaps, also, by uplifting the heavy curtains of past centuries and unrolling the scrolls penned by those familiar with this disease, thousands of years before the birth of the Saviour of Man, and by the material aid of practical common sense joining its forces to those of medical science, the latter prone, alas, at times to be blindly self-assertive, dogmatic and tyrannical as much so to day as in the day of Hervey, Jenner, and other great pioneers in medical thought—the world has learned much, and the indications are that knowledge is increasing so steadily and favorably that we are almost half justified in hoping that, at the end of the next quarter of a century, the time will then be not far distant that a controlling power shall be found for that disease of which one Atreya, who wrote, in India, probably more than 4000 years ago, said “*The man who neglects the disease at its commencement is sure to die, for it becomes incurable.*”

With these facts and thoughts present in my mind, I have deemed it a duty I owe, as the President of the Board of Health, to the Hawaiian nation, and in that spirit of benevolence to the sufferer, be he Hawaiian or foreigner, which has been one of the marked features of the Hawaiian race and its rulers, and especially so during the present reign, to make a more extended Report to your Honorable Body than has hitherto been customary. I have done so in the fervent hope, that under the Divine Will, good will result not only to this nation but to other parts of the world at large, suffering alike with Hawaii.

I have endeavored to present to you, in so far as a pressure of duties and limited opportunities permitted, the knowledge and information, in regard to leprosy possessed by many other countries, compiled and collected by the Governments of those countries expressly for His Hawaiian Majesty's Government, at my invitation, and, in some instances, bearing date as recently as the present year. To these governments the Hawaiian people should be grateful.

In this Report, taken in connection with the Supplement, I aim to lay before you the history of the disease in these Islands so far as it is to be found in the official records of the Board of Health and other sources, and so far as my researches and my experience as a resident of a quarter of a century in the Kingdom permit. In the Appendix you will find the results of the labors, and the opinions and suggestions of the medical men and others, who are, or have been, engaged on these Islands since the presentation of my last report, in combating the disease, attending to the sick, ameliorating their sad condition or soothing their dying hours. I am convinced that a careful study of the material presented to you will not only aid your deliberations on behalf of the suffering and sick among the Hawaiian people, and encourage hope in your breasts and theirs, but it will also show you that the Hawaiian nation, acting through those who have been entrusted, from time to time, with the administration of its affairs has done nobly, and generously in the front of a great calamity, and has dared more, and expended more money in proportion to the size and wealth of the country in the attempted suppression of this most lamentable malady than greater, more powerful and wealthier countries have yet attempted. It will, I trust, tend to preserve in you that true kindliness of heart, and that spirit of compassion towards the poor and suffering, that were the pride of your ancestors, and which—bloody and cruel though they may have been in battle—led them more rapidly on the pathway of enlightenment, civilization and patriotism than any other race similarly constituted and situated as was the Hawaiian when the foreigner first reached these shores.

A wise and eloquent writer has said; “that no nation can go forward that has no past at its back.” Hawaii has both a past and a history in which may not only be traced the germs and causes of its progress, but possibly also the source of the disease, so far as this

country is concerned, which forms the sad subject of this Report. The Kingdom of Hawaii in its political, social and religious life in the transition "from feudal anarchy and general lawlessness to personal despotism and stringent repression, and from that to a constitutional monarchy; from social barbarism to a degree of civilization that is unexampled in the history of mankind, considering the time that has elapsed; from the most cruel and oppressive idolatry to the spontaneous repudiation of the idols and the adoption of Christianity" owes its initial movement on the road of national progress to Kamehameha the Conqueror. It is true as Fornander says: "The dark shadows which flit across its pages are dark indeed, but they are no darker than those which, under even more favorable circumstances, have stained the annals of many a proud nation that formerly stood, or now stands, in the foremost rank of civilization." That during this extraordinary political and social revolution the shadows were not darker is due to the warrior-king. There would seem to have been a marked dispensation of Providence in the selection of Kamehameha the First to direct the chain of events during this marvelous transition period which succeeded the union of the islands under one spear and sceptre and the coming of the white race. The Kingdom had the advantage of a ruler of marked and heroic character as its founder; a man of vigorous and active intelligent thought, endowed with a strength of purpose and power which, had it been directed merely to personal aggrandizement and to sensual and sensuous existence, would have made him a cruel and selfish tyrant, and have placed these islands either in a state of continual insurrection, or of servile debasement and degradation, to fall an easy prey to the foreign conqueror or aspiring adventurer, as we see to day is the condition of other islands in the great ocean that surrounds us. Fortunately he was destined to set an example to his successors as favoring the establishment and development of this Kingdom as an

Independent State. He appreciated, and herein may be found one of the marked reasons of his special success and the proof of his enlightened spirit, the value of recognizing and acting upon the proffers of friendly reciprocation and association with the Caucasian race and of learning from them the arts of peace rather than the practice of war. He accepted their teachers and traders as his tutors and councillors, and amity and advice begat knowledge throughout the land. Hence it is that since he ascended the throne of United Hawaii, we have no bloody record of internecine wars, of struggles between race and race; of hatred, open or covert; of plots and counterplots between the native population and the strangers; but, on the other hand, calm consultations, friendly co-operation, and active associations intimately connected with the advancement of the country. Hence also, to-day, the Hawaiian State stands solid and independent before the world, so established by the wisdom of its native chiefs, aided in its organization and progressive development by a loyal and zealous white element who have become heartily and honestly Hawaiian in disposition, interest and social kinship, and as closely identified with the welfare of the land as though it were the birthplace of themselves and ancestors, rather than a land of adoption.

The spirit of Kamehameha and his advisers developing and becoming enriched by civilization and intelligence descended to his royal successors until, under our present Sovereign Kalakaua, the second transition era may be said to have arrived, since, from the King downwards, the generations of to-day have been educated—not under the old Hawaiian system, but under the influence of Christian and Caucasian methods and ideas. The puny neglected islands of the Pacific hailed, scarcely a century ago, as merely a new acquisition for a missionary station, or a half-way inn for sailors, are rapidly gaining recognition as worthy to be ranked and received among the most powerful and enlightened Sovereign States of the world, as being fruitful of good deeds in peace, though powerless in war.

In this half-won struggle for advancement, Hawaii has undergone, and is still undergoing, the stern trials attaching to all rising nations. She has been heavily handicapped in being stricken with the terrible and deadly disease of leprosy and with other maladies that have carried off her people by the hundreds of thousands. Elsewhere I shall speak of the lives we have lost and the treasure we have expended on account of these visitations.

But why should these Islands have been so signally afflicted? There must be a cause for it. In these days we cannot be content with the explanation of the middle ages that it is the wrath of God.

In view, then, of the great and bewildering masses of information gathered by medical men as to the causes of leprosy, and in view also of the many published errors in regard to leprosy in this Kingdom, let us search for a sensible cause practically, and not as professionals pledged to individual schools of thought or line of experiments. Let us do it in a friendly attempt to aid science and not to baffle it or ourselves, and not in an assertive but in an enquiring mood, having for our main object the elucidation of facts and the alleviation of the misery of our suffering countrymen.

Whoever will studiously peruse the very numerous medical statements which accompany this report, will observe that each of the propositions I am about to place before you can be answered as readily in the affirmative as in the negative, and with probably an equal array of argument on either side. Let us make these propositions then, thus:

It is impossible to attach to this Hawaiian race and to these Islands any distinctive feature as a character or cause of the disease.

It will not do to say that it is owing to an admixture of foreign races predisposed to the disease, or to inbreeding producing scrofulous races, or that the race is in itself predisposed to scrofula, malaria and many other assistant diseases.

It will not do to say that it proceeds from climate, from the diet of the country or from want of cleanliness.

It will not do to attribute it to any of these causes, solely or conjunctively, for the unfortunately baffled medical world repeatedly points out to us that all these conditions exist in non-leprous countries and races. I will, however, presently review all these conditions as they are found amongst us, and see whether or not they can be made actually applicable to us wholly or in a degree.

About the great hold that leprosy has taken upon this nation, there is no doubt; but as to when it first began its ravages here there is very grave doubt, and in the ascertaining of the era of misfortune may be found a solution of one portion of the perplexing problem. Although it has been stated by our best medical observers that the disease is but a recent comer among us, and dating back not more than 40 or 50 years ago, I am strongly disposed to join issue with them.

THE INTRODUCTION OF THE DISEASE.

It has been asserted by the early authorities that leprosy was introduced by a Chinaman, and consequently was called the *Mai Pake*, or Chinese sickness, as native Hawaiians could find no better name for the disease in their vocabulary. I do not believe it was introduced by a Chinaman, any more than I believe it was imported from China by the warrior chief Keawe Kaiana-a-Ahuula when he made his voyage with Captain Meares in 1787. I might, *en passant*, enquire how it is that if one Chinaman caused such an alarming spread of the disease thirty or forty years ago, there are now, comparatively speaking, so very few cases of leprosy among the seventeen or eighteen thousand Chinamen on these islands, and no recorded cases, that I am aware of, of an imported Chinese leper since the enactment of the anti-leprosy law. Again, if the disease had been introduced by the Chinese, and propagated by them in proportion to their intimate connection and

association with the females, especially young children, of the native race, I should expect to find a much larger proportion of females than males affected with this loathsome malady, and yet we all know that the contrary is the fact, in spite of the census of 1884 giving only 18,220 females over 15 years of age to 17,000 male Chinese of all ages.

To those, who are intimately acquainted with the Hawaiian language, the mere fact that there is not a distinctive word in the language argues nothing, inasmuch as the idiom is remarkably deficient in medical nomenclature, consequent upon the absence of any regular study of the human system or ailments. The Hawaiians possess generic words for the pains or sensations attaching to the several classes of sickness to which they are most prone, such as: *Mai wela*, hot sickness; *mai annu*, cold sickness; *mai pūpū*, lumpy sickness; *mai ulalii*, sickness of small red spots (measles), and so on. I believe that there is enough of assurance in the general opinions of intelligent Hawaiians that the disease has existed here for a much longer period than usually accredited. Old natives speak of a disease in the past, attended with swellings, disfigurements, insensibility and ulcerations, and which diseases correspond with what medical science calls *Elephantiasis Arabum*, and not true leprosy; but there is, nevertheless, some ground for the presumption that the *Elephantiasis Græcorum*, or true leprosy, existed since ancient times. However, in the absence of fact this is only surmise. But in this connection an interesting extract from the diary of Rev. C. S. Stewart, 1823, will be found in the report of Dr. Mouritz, on page LXXIV, Appendix K. On P. XXVIII of Appendix E, a well defined case of leprosy in 1845 is mentioned, and cases might be given dating back into the Thirties. I am inclined to think that the disease escaped the notice of the early missionary medical writers owing to the fact that their want of knowledge of its true symptoms and correct diagnosis led them to place it within the definitions of venereal

and scrofulous ailments. Their writings and opinions are, however, to a certain extent valuable, and it is only fair that we should consult them in our desire to learn all we can in regard to the various causes assigned and the circumstances attendant upon the uprising of this disease in its peculiar virulence. Let us then turn to these, the earliest of our foreign observers, and see what they had to say in regard to the inhabitants of these islands within ten and twenty years of the date of the landing of the first American missionaries in 1820. They write freely about the diseases and condition of the people, of their food, their customs and their morals in the era before which, modern writers would have us believe, leprosy began its ravages among our people.

THE NATURAL PHENOMENA OF THE ISLANDS.

But first, as regards climate, which some writers think is a potent factor in the disease, I cannot do better than quote from Dr. Alonzo Chapin's description republished from the "American Journal of Medical Sciences" in the "Hawaiian Spectator," of July, 1838. Dr. Chapin says: "Situated in the very midst of the vast Pacific, without any extensive inland causes to affect the temperature, and remote from the cold chilling winds of the temperate and frigid zones, the Sandwich Islands possess a remarkable evenness in the degree of atmospheric temperature. Cool breezes, by day from the sea, and by night from the mountains, serve to mitigate the burning heat produced by a vertical sun, and to render the climate pleasant. The thermometer varies but little from day to day, and even from month to month; and what is particularly to be remarked, all portions of the islands, along the shores, are alike in this respect. Districts most parched by heat and drought do not differ essentially in temperature from those sections where almost daily showers and perpetual trade winds prevail. As we recede, however, from the low lands along the sea and ascend the mountains, a

change is immediately perceived, and along their extended sides we may procure almost any degree of temperature. The greatest heat marked by the thermometer at Honolulu was 88° , lowest 59° , and range 27° .

In dealing with the telluric agencies and physical conformations of the islands I prefer to again quote from the same distinguished medical authority who says: "The interior of each island is uniformly elevated, and among them are found mountains of the first order of elevation. Those on Hawaii rise to the height of about 14,000 feet and have snow on their summits a great part of the year. The whole group are of volcanic origin. Numerous extinct craters of different periods and dimensions are scattered over the surface, and two large volcanoes are still in action, affording immense currents of liquid lava. The shores of the islands are much diversified, and furrowed with frequent ravines, some of great depth, which furnish courses for the impetuous mountain streams. Plains of different dimensions, varying from a few rods to many miles in extent, are frequent. More commonly, however, the mountains extend with a gradual slope entirely to the beach, and here and there present bold and black lofty precipices to the dashing of the wave. The sides of the mountains, if we except the loftiest, are verdant entirely to their summits, and present immense tracts of exceedingly fertile soil. The leeward shores have generally an arid and even sterile aspect, owing to the infrequency of rain. Vegetation is there promoted mostly from irrigation from the streams, and it is only the tracts immediately contiguous to these which possess much verdure, or will admit of cultivation. The condensation of the vapor, from the damp trades in their passage over the mountains, produces continual rains on their summits, which, extending backwards towards the sea, keep the earth wet much of the time, and give rise to a luxuriant growth of vegetation. Hence the inward sides of all the islands are, unlike their lee-

ward shores, extremely fruitful and productive. * * * The streams originate from springs and rains on the summits of the mountains, pour down their sides with great impetuosity and after a few meanderings are turned aside from their course to irrigate the lands and replenish the fish ponds, or are discharged directly into the sea; and I know of no body of water emitting sufficient miasma to create sickness along its borders. I have occasionally met with stagnant ponds, which emit a foul and offensive odor, and could in no way satisfy myself of the reason for the exemption of the inhabitants along their borders from fevers, but by supposing the effluvia to be diluted and rendered inert by the continual currents of winds. Small marshes abound but are fed by springs, and the pure mountain streams, and are thus prevented becoming noxious. They speedily dry up during a few weeks absence of rain; and the rivers also disappear unless kept alive by frequent showers, and the small pools, which remain at such times and which abound after every rainy season, do not become sufficiently putrid to exhale a *fever-generating* miasma. If any one variety of *soil* has a specific power to produce malaria it does not appear to exist at those islands. The upland soil is there formed of decomposed lava, the lowland plains along the sea are constituted of a mixture of alluvion washed from the mountains, and decomposed coral. Its immunity from noxious exhalations is the same, whether parched with drought, or merely moist, as when the evaporation is most abundant after the rains."

The native food next claims our attention. The staple article of diet as described by Chapin was *poi*. "The *Arum Esculentum*, which is more generally eaten by the inhabitants than any other vegetable, grows like the *Arum triphyllum*, in wet or damp situations only, and when uncooked, is, like that, exceedingly styptic and acrimonious. These qualities are destroyed by heat. The natives prepare it for use by cooking it thoroughly, pounding it to a pulp, and adding water sufficient to

make a thick paste, in which state it is called *poi*; and thus prepared, it is eaten with one or two fingers, according to its consistency. As an article of diet it is simple and nutritious; and after the fermentative process has commenced it is preferred by the people."

The sweet potato, the *pula*, a fern root, the tops of the *pulu* fern, the bread fruit, the cocoanut, the candle nut, the banana, many varieties of sea weed, along with a great variety of fish and crustacea, eaten raw, and the meat of the hog and dog, baked in the earth, constituted the chief articles of ancient Hawaiian diet.

EARLY DISEASES OF THE HAWAIIANS.

Having thus touched upon three "influential factors" let me pass on to what these writers say in regard to the diseases which, according to their information and opinions, afflicted the Hawaiians in those days. Dr. Chapin says: "The equableness of the climate, and the simplicity of the natives in their regimen and most of their habits of life, are, compared with *civilized* countries, such that the variety of their diseases is neither numerous nor complex. Their remoteness from other lands is so great that but few contagious diseases are imported among them. * * * The diseases most common within my circle of observation, were fevers, ophthalmia, catarrhs and asthma, rheumatism, venereal diseases, diarrhoea, dysentery, cutaneous diseases, scrofula, dropsy, etc., and they occurred in frequency and in about the order in which I have mentioned them. Diseases sometimes occur epidemically, as was the case with catarrh repeatedly, and croup once during my residence at the islands. Many other diseases, not specified, were often met with. Fevers.—Though this is the most frequent and numerous class of diseases among the native population, they are by no means the most malignant and fatal. They occur in almost every form, but when idiopathic are usually remittent. They are, however, most frequently symptomatic of other diseases. The excitable state of the system, which predisposes

so strongly to febrile attacks is not common to these islands. *The continued and oppressive heat is there not sufficient of itself to produce it*, and the universal custom of the people, to repose during the hottest part of the day, aids in counteracting other unfavorable influences. The simplicity, too, of their diet and habits of life is not calculated to promote a state of excitability. Their food is mostly vegetable, with but a scanty and irregular supply of meat. Until of late they have made use of none of the stimulating condiments so *profusely* employed in *civilized* countries, their only drink is water. In their movements the natives are extremely moderate. They walk with a slow step, rest long, and often when tired, and placing no value on time, they do everything leisurely and to suit their convenience. * * With so entire an exemption from the existence of miasmata, there is also an entire exemption from those affections induced by it. Malignant bilious fevers do not occur, * * * derangements of the liver and biliary organs do not prevail, neither are the stomach and intestinal canal, and other organs of the abdominal viscera subject to the numerous and complicated affections so common in every miasmatic region."

Dr. Chapin then discusses; and the point may have an important bearing upon the disease I am considering, "some particulars of a cause (colds) which operates more extensively than any other morbid agent, and produces probably more than one half of all the diseases which exist, and more than three-quarters of all the idiopathic fevers on the islands." "The habitations of the natives," says the Doctor, "are for the most part considerably scattered, but in a few instances crowded together in such numbers as to exhibit the dense appearance of large towns and villages. There is, however, throughout an entire exemption from those pestiferous exhalations which so extensively poison the atmosphere of populous places in hot climates. All animal and vegetable substances thrown away by the people, or cast up by the sea, are quickly devoured by the number of

starving dogs and swine, so that no detriment is experienced from their putrefaction," but "the dwellings of the native population are merely slender frames of posts and poles tied together with strings and covered only with thatch. They are generally small, often so low as not to admit of standing erect within, and in their best condition serve as an imperfect protection from the wind and rain, and the excessive heat of a vertical sun. Every atmospheric change is quickly felt. Cold and dampness easily penetrate, and no sooner exist without than they are felt within. Add to this their leaky condition, the almost naked state of the inhabitants, their common practice of sleeping at night on the bare earth, outside of their houses, and their habit of continuing long in the water and exposing their bare bodies to strong currents of wind, when overcome with heat and perspiration, and it will not be surprising that diseases incident to such causes should abound. Fevers, induced thereby, are numerous."

CONSTRUCTION OF NATIVE HOUSES.

Now let me turn to the "Answers to Questions," proposed by the late Robert Crichton Wyllie, the faithful Minister of Hawaiian Kings, and addressed to all the missionaries on the Hawaiian Islands, May, 1846," and presented to the Hawaiian Legislature of 1848, and see what these gentlemen said in regard to the same subject. My reason for quoting so largely from these writers of forty years ago will be apparent later on.

Rev. T. Coan says: "Native houses are usually too small, too low, too dark, not well ventilated, too filthy and too perishable in their materials and construction."

Rev. J. S. Green says: "The native houses are certainly defective, exceedingly so. Most of them are without partitions. * * * Still nearly all could make improvements in their style of building did they realize the importance to their physical and moral health of having comfortable dwellings." Rev. E. W. Clark says: "The houses generally are grass huts, many of

them miserable. Some have permanent partitions, but not the majority. Less improvements have been made in houses and in dress and furniture. * * * Natives accustomed so long to a mere shelter, do not feel the inconvenience of their houses." Rev. R. Armstrong says: "The houses are generally too small, without ventilation, floors, windows, or partitions, and extremely unhealthy. Many are very damp from the ground as well as from the rain. Rev. B. W. Parker says: "The native houses are almost invariably small, poor and uncleanly." Rev. A. Bishop says: "The houses of the common people are defective in almost everything which constitutes civilization." Rev. J. S. Emerson says: "The native grass houses when well built, are probably more healthy than any others, if they are not suffered to be damp by having no floor. The convenience of windows would be great but expensive. Floors would greatly induce to health, partitions would aid much in advancing moral purity; but neither are much sought by the people at present." The Rev. Mr. Green says: "The method of living in small houses, having no partitions, and crowded with men, women and children is exceedingly unfavorable to the formation and strengthening of virtuous habits, but exceedingly favorable to the vicious propensities." Mr. Armstrong, in speaking of the licentiousness of the natives, observes, "The causes which lead to it are such as idleness, living in small and miserable houses, without partitions, a debased state of the moral feelings and the licentious conduct of many foreigners."

Let me again return to Dr. Chapin, and see what he has to say in regard to certain ailments of the native race which were also, probably, factors in the problem I am endeavoring to solve. On the subject of venereal diseases the Doctor says, (and in the absence of *proof* to the contrary I accept the statement with reservation and subject to the remarks I shall hereafter make.) "If it be a fact, that the aborigines of America were affected by syphilis and gonorrhœa before Europe-

ans visited them, or if, as is presumed by Dr. Thompson, 'syphilis has been thousands of times generated *de novo*, by impure intercourses,' it is certain neither disease existed, or was known at the Sandwich Islands before the visit of Captain Cook, in 1779. The natives had ever lived in the practice of promiscuous and almost unrestrained intercourse, so that the women were often unable to designate the father of their children; still their practises were not attended with those consequences which follow the licentious in all civilized countries. Those who have the credit of the discovery of the islands, and of exhibiting first to the astonished gaze of the simple and ignorant natives, some of the ingenious and useful implements of enlightened lands, * * * must also receive the credit of having introduced among these islanders two of the vilest and most loathsome diseases ever sent as a punishment for transgression. And upon the same page on which is recorded the benevolent efforts made to improve their condition and circumstances, * * let it also be recorded that they entailed upon their beneficiaries, a disease which has 'grown with its growth and strengthened with its strength,' which has extended its course with destruction and death, till all portions of the group have become infected, and countless multitudes have fallen victims to its power. With such an introduction, the venereal disease has for the past fifty-seven years continued to spread and increase; perpetuated and extended too by almost every vessel which touched at the islands, till words would fail to express the wretchedness and woe which have been the result. *Foul ulcers, of many years' standing, both indolent and phagedenic, everywhere abound, and visages horribly deformed—eyes rendered blind, noses entirely destroyed, mouths monstrously drawn aside from their natural position, ulcerating palates, and almost useless arms and legs,* mark most clearly the state and progress of the disease among that injured and helpless people. I have seen more than one case of marasmus induced by the difficulty of mastication and degluti-

tion. The mouths of these patients were almost closed in the process of cicatrization, and the gums and fauces were destroyed by ulceration. In one of my patients suffering with the secondary symptoms of the disease, in which I was successful in stopping its progress by a mercurial course, the external nose had entirely disappeared, and its place was occupied by a concavity and a foramen of an irregularly oblong form. The left eye was totally blind, and both disfigured by ulceration as almost to lose their identity. The mouth was shockingly deformed; the lips and alveolar processes mostly removed by absorption, and the teeth having their necks and a portion of their roots divested of integuments, were irregular in their distances and positions, pointed in every direction, and but slenderly adapted to the purposes of utility. The whole countenance was disfigured by deep eschars, and the body greatly emaciated; no food could be masticated by him, so bad was the condition of his mouth."

In regard to cutaneous diseases and scrofula, the Doctor says: "Though the Sandwich Islanders are remarkably fond of the water and are fastidiously particular in their practices of washing and bathing, they are, nevertheless, extremely filthy and squalid in many of their habits of life. With their beasts and fowls in the same habitation, and not unfrequently on the same mats with themselves, their often repeated ablutions will be regarded as timely. The kapa, or native cloth, used by the inhabitants is worn without cleansing till having become foul with dirt and vermin, and too ragged to serve longer the purposes of covering or protection, it is lain aside. Hence diseases induced or exacerbated by such causes have at those islands a fruitful soil and flourish luxuriantly. The *itch* is extremely prevalent, and often assumes a virulence unseen in this country, the pustules sometimes becoming confluent are converted into large and troublesome ulcers. Other scabious affections exist. *Scrofula* is not only frequent but extremely malignant."

Now let me turn again to Mr. Wyllie's report in this connection, and examine the replies to the question regarding *diseases prevailing, contagious or epidemic*, but before so doing I desire to say a few words parenthetically to the foreign readers of this report. For many years the Hawaiians have been presented to the world as being inordinately licentious, utterly profligate, absolutely abandoned and worthless in character and wholly deficient in moral principles. The responsibility for this gross defamation of character, by careless exaggeration, must rest, in a large measure, upon those from whom I quote and their associates, friends and correspondents. It must be remembered that they were men of a strictly religious turn of mind, more adamant in pulpit and print against every infraction of the divine or moral law than the God-man Himself whose teachings they came to impart. They judged an indigenous aboriginal race *sinning in ignorance*, and learning *the sin of sinning* from white sailors, whom they at first regarded as equals, if not superiors, in power and knowledge to their would-be spiritual benefactors, as if these poor, generous, hospitable, loving and ignorant natives had had opportunities of learning to be immaculate and holy. The hardworking missionaries were few, and the libidinous foreign sailors numbered by the thousands, and while the one aimed to teach an entire change of life, manners, dress and customs with a somewhat severe and repressive hand, the other offered pleasure and profit unrestrained by thoughts of future pain and punishment. No more should the blame of sin, disease and defects in character be thrown upon the native race than the credit of their present high degree of intelligence and advancement should be entirely given to their spiritual teachers. The intellectual and material progress and the disease, and such debasement as may exist, must be accredited to foreign influence, to the teachers on the one hand and to the licentious white men on the other. Nor does this latter class include sailors alone, but even at the

present day it is largely made up of young white men whose family antecedents and position in life should make them defenders instead of destroyers of the native race.

But to resume, Mr. Coan says: "the principal diseases are of the venereal, scrofulous and cutaneous character. The climate, however, is 'remarkably healthy.'" Mr. Green says that no diseases prevail contagiously or epidemic in his district (Makawao). "Occasionally the influenza prevails; but on the whole, since I have resided among these people, they have been exempted from diseases to a remarkable extent." Mr. Bishop says: "No contagious diseases except *cutaneous eruptions* which are very prevalent and distressing. * * * But the most prevailing and mortal diseases are consequent upon the *venereal corruption* of the blood." Mr. Emerson says, "the itch and venereal diseases are destructively contagious."

It may not be amiss to say here, that the opinions I have quoted were written when the native race numbered three or four times more than the present population of 40,000, and that sixty years before they were computed at ten times as many.

But there is another dark chapter to be written before I pass on to the next chain in the link of tracing cause and effect, and again I quote from Mr. Wyllie's report. The question asked is: "How far is it (physical health) affected by the enervating effects of indolence and indifference, as to anything beyond the mere wants of animal existence?" Mr. Coan replies: "Physical, mental, and moral imbecility; disease and vice are extensively engendered, and sadly perpetuated by indolence and indifference to anything beyond the mere wants of animal existence." Mr. Green says: "Greatly affected. Nothing compared with these, as a source of suffering, both moral and physical. Here is the fruitful source of vice, misery and death. The nation is *rusting out*." Mr. Clark says; "Indolence here, as everywhere, has a debasing influence on the moral and

physical condition of the people. It is the mother of vice and disease. As artificial wants increase, the character of the people is generally elevated." Mr. Parker says, "Both the moral and physical health of the natives is most seriously affected (injured) by their indifference and improvidence." Mr. Bishop says: "Indolence is attended with enervating effects on the constitution. This is evinced in the females who have little to do, and yet they are more subject to sickness than the men. Perhaps there are other causes productive of sickness in many females; the consequences of vicious idleness." Mr. Emerson says: "This people are indolent, and many of them improvident; and sickness and death are often the result of this improvidence. They have no beds for the sick, and no suitable food or diet in such cases. Their houses, mats and sleeping places often generate disease, and prevent the effects of suitable remedies, if administered, and often deter from the attempt to administer remedies that would be suitable, if circumstances would allow of their use. But whether this indolence and improvidence are peculiarly inherent in the Sandwich Islands, or the result of a system of oppression long practised, in connection with the absence of that stimulus produced by the artificial and imaginary wants connected with civilization is yet to be proved." Mr. Gulick says: "Very injurious, and to a considerable extent. Yet this indifference appears to be merely the result of the system by which, till recently, they were deprived of nearly all their rights, and thereby precluded from the hope of materially bettering their condition." Mr. Johnson only says: "I think the moral and physical health of this people is, in some degree, injured by indolence and indifference to the wants of both body and soul."

WHENCE THE DISEASE WAS DERIVED.

In my report to your Honorable Body, in 1884, I said: "I beg to urge that Hawaii take a larger part in pursuit of such researches. She is attacked by a terrible enemy. . Let her study everything pertaining to its origin, resources, and favorable conditions. Leprosy has, at times, attacked every race in the world; but its chief abiding places have been parts of Asia. Some of the islands of Malaysia have also been fecund hot-beds of the fell disease. In Java, and other islands of the great Archipelago, where the natives present most striking affinities with the Hawaiian race, the diseases that afflict them also afflict the Hawaiians. The Javans treat as outcasts all who are suffering with the *kudig*, or leprosy, and the unfortunate ones have voluntarily segregated themselves upon small islands, where they are supplied with the means of subsistence by their friends." I added, and I am still of the same opinion, that, "I think it would be well that the disease which commands so large a share of public attention, and calls for so large an appropriation of the public revenue should be studied by competent authorities under Hawaiian auspices in various parts of Malaysia and Polynesia, where it is to be found."

I do not purpose to enter into a long ethnological discussion to trace the origin of the disease in this country, or if not its origin, a possible source for it, but I cannot refrain from touching upon the subject in partial connection with the origin of the Hawaiian race and the existence of leprosy in India from the most ancient times, as presented by the very valuable series of reports furnished by Her Imperial Majesty's Government of British India to His Majesty's Government.

My views on the origin of the Hawaiian and Malaysian races have been published and are known to those who take an interest in such subjects. While they may differ in a degree they coincide in the material point of origin with those of Judge Fornander, who in his work

on the Polynesian race, says: "I believe I can show that the Polynesian family can be traced directly as having occupied the Asiatic Archipelago from Sumatra to Timor, Gilolo, and the Philippines, previous to the occupation of that Archipel by the present Malay family; that traces, though faint and few, lead up through Deccan to the northwest part of India and the shores of the Persian Gulf; that, when other traces here fail, yet the language points farther north, to the Aryan stock in its earlier days, long before the Vedic irruption in India; and that for long ages the Polynesian family was the recipient of a Cushite civilization, and to such an extent as almost entirely to obscure its own consciousness of parentage and kindred to the Aryan stock." And again, "I hope to be enabled to show that the Polynesian family formerly occupied, as their places of residence the Asiatic Archipelago, and were at one time in the world's history closely connected by kindred, commerce, or by conquest with lands beyond, in Hindustan, the shores of the Persian Gulf, and even in Southern Arabia."

The Secretary to the Government of India states that at the present day "there appears to be at least three centers of comparatively intense prevalence, viz:

(a) The Beerbhoom and Bancoora districts in the districts in the lower provinces of Bengal;

(b) The Kumaun district in the Northwestern provinces;

(c) The Deccan and Konkan in the Bombay and Madras Presidency, respectively."

In other words that in, and surrounding the cradle, from which the great and ancient races from whose loins were derived the Hawaiians, the disease still prevails in the strongest form. Turning to page 80 of the Indian Report, I find a statement by Messrs. Lewis and Cunningham, Assistants to the Sanitary Commissioner of India, that "the disease has been known to exist in India for at least 3,000 years," but "with regard to our definite knowledge of its actual causation,

it is to be feared that we have not, except phraseologically, advanced very much on the etiological views recorded by Atreya many centuries before the Christian era, which were to the following effect: "When the seven elements of the body become vitiated through the irritation of the wind, the bile and the phlegm, they affect the skin, the flesh and the spittle, and the other humours of the body. These seven are the causes respectively of the seven varieties of *kushta* (leprosy)—the *kudig* of the Japanese. This *Atreya* lived at least 2000 years before the Christian era, and wrote the "*Charaka Sanpita* on the pathology of the disease," extracts from which will be found on the pages above quoted. In these extracts he describes the various kinds of leprosy, the descriptions of which are already recognizable as forms of disease existing at the present day. He says: "the *kushta* thus produced cause much pain and suffering. None of these varieties result, however, from the vitiation of a single humour. *Kush-tas* are of seven, of eleven, or a larger number of a kind: and these constantly irritating the system become incurable. * * * The wind, the bile, and the phlegm, being vitiated, re-act on the skin, &c. When the wind is most vitiated it produces the *kadala kushta*, the bile, the *audumbara*, the phlegm the *mandala*, the wind and the bile the *rishyajihva*, the bile and the phlegm, and the wind the *sidhma*, and the three together the *kakanaka*." The causes of the disease Atreya gives as being: "Excessive physical exercise after exposure to too much heat or too much cold; taking food after surfeit; eating of fish with milk; using barley with several other grains, such as 'hayanaka,' 'dalaka,' 'karsdusa,' &c., along with venison, milk, curdled milk and butter milk; excessive sexual intercourse; long protracted excessive fear or labor; fatigue, interruption of catarrh, &c., vitiate the phlegm, the bile, and the wind; hence the skin and the three others become slackened. Thus irritated, the three elements corrupt the skin and others, and

produce 'kushta.' The premonitory symptoms of 'kushta' are as follows: Want or excess of perspiration, roughness, discoloration, itching and insensibility of the skin, pain, horripitation, eruption, and excessive pain on the parts that are about to fall off." "The worms that form in leprous eruptions destroy the flesh, skin, veins, muscles, and bones. When affected by them, the patient suffers from spontaneous discharges of blood, insensibility, loss of sensibility of the skin, mortification, thirst, fever, dysentery, burning, weakness, disrelish and indigestion. The 'kushta' becomes incurable."

THE LEPROSY OF THE BIBLE.

As regards the Biblical leprosy as defined by Moses in Leviticus, this might have been derived from the same original source. The book of Leviticus, according to accepted dates, was written subsequent even to that of Atraya by several centuries, and from quotations in the latter's writings it is certain that he was the earliest writer on the subject. The disease might have been introduced by the great migratory race founders into Arabia and thence into Egypt, and propagated among the Israelites during their bondage to the Egyptians, since we find in Deuteronomy, chapter 28, v. 27, the threat implying the fear and knowledge of the disease, "the Lord will smite thee with the botch of Egypt, and with the emerods, and with the scab, and with the itch, *whereof thou canst not be healed.*" It is not easy to decide from the Mosaical description of the disease whether the leprosy referred to was the 'kushta,' or some of the other varieties such as leucoderma, or white skin, but from the verse just quoted I am inclined to think that it existed even in its most deadly form. It will be noticed throughout the Bible, that it was invariably treated as an unclean disease, and one for which, in addition to obedience to the sanitary commands of the Priest, sacrificial atonement had to be made, as if for a violation of the moral as well as phy-

sical sanitary laws. I am also inclined to believe that it was more than a common cutaneous affection and was considered to be both contagious and infectious, for not only were the lepers set apart from the clean, but their clothing and even their homes were destroyed. That the Jews, as the world grew older, gradually became freer from the loathsome malady is probably due to their hygienic laws being far stricter than those of the other nations with whom they were brought into contact in their wanderings, either as a nation, sections of a nation, or as individuals. It is more than probable I think, that the germs of the disease, too, were being insidiously spread through Europe by the adventurers, navigators, discoverers and conquerors, developed by these ancient races long before the Crusades, the accepted modern date of its introduction into Europe.

HEREDITARY TRANSMISSION OF THE DISEASE.

Messrs. Lewis and Cunningham state "that the inhabitants of the Kumaun districts virtually consist of two classes only—Rajputs and Domes, the former representing an Aryan population, the latter an aboriginal people—whilst other classes are only very sparingly represented," and that in their cases, "the evidence, such as it is, is in favour of impartial distribution of the disease," but on the question of the heredity of the disease they say the evidence they produce from the Almorah Asylum, "allowing the fullest play to the possible influence of similarity of external conditions, points to the distribution of the disease by families and therefore to hereditary predisposition." They support their position by statistics which very strongly endorse similar views of other writers.

In view of the immense mass of testimony *pro* and *con* in regard to the hereditary transmission of the disease which forms part of my report, and yet which I think, in the main, will support to no little extent the view of a latent race predisposition in individuals of that race capable of being developed under conditions favorable

to the germinating of the disease germs I will pass on to the consideration of what has been observed in the descendants of the more ancient races, and of the more direct cognate races of the Hawaiians, not the modern Malays who are scarcely older in Malaysia than the Normans of the English conquest in England, but to the more ancient stock such as the Sundees, the Timorese and the ancient people of the Moluccas. These were recognized as the aborigines of the Country, whose language, religion, habits and ideas bear a stronger resemblance to those of Polynesia than any others of insular Asia, and among them to this day we find the same disease, as the Hawaiians are, and have been, subject to. Here leprosy has been known for generations and a system of voluntary segregation carried out. That is to say, lepers resorted to certain islands where they were occasionally visited by their friends who brought them their means of subsistence. In Tahiti, also, to judge from the description of travelers, a form of leprosy, or of elephantiasis, was known at least a hundred years ago.

Thus far I have endeavored to show that should leprosy be a disease upon which the influence of race has any effect, that influence must necessarily have its effect upon the Hawaiian race as the descendants and conquerors of those in whom the earliest seeds of that disease were implanted, and through whom, for generations after generations, the seed ripened and was re-implanted. In supporting this theory it is not necessary to hold that the sequence would be that the whole race should be diseased or even pre-disposed to disease, for we find that there is evidence from all parts of the world that, owing to circumstances, or perhaps in the absence of the necessary influences to nourish disease, the non-resistants are in a large majority. As a rule, too, the evidence shows that while the chiefs, and the "better classes" are occasionally attacked, the poorer, and practically servile classes, badly educated, sparsely clothed, ill-fed, and wretchedly housed, form the immense majority of the victims.

WHAT, THEN, IS LEPROSY ?

If asked my opinion of leprosy and how it originated, I will reply with the proper modesty of a layman,—not altogether unfamiliar with medical works on the subject, nor altogether unexperienced with the disease in this and other countries—in the presence of learned professional and scientific observers and writers, I do not know, nor apparently does any one, but I think that in all probability it is a disease caused in its earliest incipency by a demoralization of the system by uncleanness, not merely of the surface of the body,—for we find in India, especially, that some races that never wash enjoy an immunity from the disease—but of the blood, poisoned, perhaps, to a very great extent by a degraded condition of living, or by excessive indulgence of the animal nature in a tropical climate ; for, so far as my reading extends, I may be permitted to say that the disease was not only originated in but has thriven better in hot than in cold climates ; the exceptions of Norway and New Brunswick are comparatively minor ones in proportion to the leper populations of the tropical world.

While I am not prepared to consider the medical question of the relation of leprosy to syphilis, I am inclined to believe, and to say, that syphilitic blood poisoning has played no small part in the development of the disease in these Islands, in connection with the inherited disease and “constitutional taints” of the Islanders, such as are mentioned in the earlier portion of my report. I think that the mind, also, is no unimportant factor in aiding the propagation of the disease. I see no reason why, in the scheme of the Great Creator, the human body should not be placed on the same plane as the members of the animal and vegetable world in its relation to health and disease. Any gardener knows that by cultivation he can improve his flower and fruit, and by care and grafting and selection of seedlings create new varieties, and from a sorry crab

apple grow a Blenheim orange, or by the reverse process, by impoverished soil, thriftless untidiness and uncleanness deteriorate the plant or tree, poison not only its flowers and leaves through the sap but allow its bark to become the refuge and home of insects and fungi. The unhealthy plant not only produces no fruit but dies the lingering death of a leprous human being. And so it is with animals, inbreeding, or breeding with inferior stock deteriorates the original stock and the weak puny animals succumb to influences which the stronger resist.

But with this inscrutable malady of leprosy, as Dr. Tache, of Tracadie, says:* “There are some instances of such a *slow progress* and such an *attenuated malignity* of the ailment that life and even fair health are enjoyed for many years,” and as Dr. Vandyke Carter, in speaking of the Norwegian lepers, says:† “But, while the coast-dwelling peasantry of Norway, in comparison with other (not all) countries of Europe, have admittedly long dwelt in a backward hygienic condition, living much on fish and potatoes, intermingling freely and being subject to overcrowding during their long winters; still, on the other hand, it is notorious that they are an unusually well developed and long-lived race; and besides, individual lepers are, as often as others, even robust people.” and yet, to quote Dr. Moore, the leper must be in “a state of human system below par,” and therein in spite of the apparent strongly built physical frame lies the whole secret of the disease, and its remedy,—a remedy not for the generation inheriting it, but for the survivors, not only for the absolutely healthy ones but also for those, even, in whom the disease germs may be lying dormant, only waiting to be destroyed by wise and sanitary culture or to be nourished into virulent life by baleful encouragement.

* Page 137, Foreign Reports.

† Page 91, Foreign Reports.

A PROBABLE CAUSE FOR ITS SUDDEN DEVELOPMENT.

Having thus far endeavored to show that the disease has been possibly dormant in the Hawaiian blood for many centuries, appearing, probably, in individual cases to a greater or less degree before we, of a foreign race, were brought into contact with them, let me now proceed to give my reasons for its apparently unexpected outbreak twenty or thirty years ago, or at the era when it was first brought to the cognizance of the Hawaiian Government.

Accepting Fornander's views that "that branch of the Polynesian family, from which the oldest ruling line of Hawaiian chiefs claim descent, arrived at the Hawaiian group during the sixth century of the Christian era," we have a history of nearly eleven centuries of a race living in practical non-contact with a white population. And furthermore of a race which was in earlier times according to Mr. Horatio Hale so prolific that it threw off its "too-redundant population by migratory expeditions" to various islands of the Pacific, to Easter island and the Hawaiian group for instance, and occupied "over three thousand years for this gradual process of redundancy and relief."

Cook and the earlier writers estimated the population of the Hawaiian group, only a little more than a century ago, at nearly half a million inhabitants. These people were practically governed as were Europeans in the earliest and most tyrannical days of early feudalism. Their lives, virtue and property, such as a semi-servile feudal class might possess, were at the mercy and will of the chiefs from the highest to the lowest in turn. Their food must necessarily have consisted principally of a vegetable and fish diet, with swine and dogs, or some small animals for—since cattle were unknown before the advent of foreigners—animal food, and for a beverage, water or products of roots, bark, etc. They were, however, in their primitive style of living, strong, robust and healthy, living and loving as sons and

daughters of the sun and sea, but intermarrying and inbreeding, as passion, or caprice, dictated. Of their diseases we have no reliable record at hand, but it is not unreasonable to presume that they possessed the morbid taints of their ancestors, and their ills were treated much in the same way as in the earlier days of the transition period by the native *kahunas*, or doctors and sorcerers; a treatment which apparently was a trust in the native Gods and the resistant powers of the patient, assisted by a rude knowledge of the medicinal power of herbs, roots and earths.

THE LATENT FLAME BURSTS FORTH.

The first spark that ignited the latent flame of disease and death was undoubtedly the arrival of the first foreign ship—be it Capt. Cook's or another's. It is unnecessary to repeat the statements of early writers as to the rapidity with which the poor, ignorant, simple and innocent minded natives were impregnated with one of the most foul and loathsome diseases that nature has inflicted upon man for outraging her laws. The disease was sown, and being neglected it increased in malignity and virulence, as it was passed around promiscuously from body to body. No mercy was shown to any, the women flocked to the sea ports, the white Gods, so regarded by these unhappy creatures, passionate, reckless and unscrupulous, after their long voyages and abstinence, sacrificed them by the hundreds to the bloody Moloch of their lusts. Inbred by generations, reinvigorated by the pestiferous embraces of thousands of white men it became perpetuated in the blood of those who yielded to temptation. When I remember that in the last 75 years at least a quarter of a million of men, of the white race principally sailors, in visiting the shores of these islands have indulged in unrestrained intercourse with the poor women of these islands, I am not surprised at the reduction of the population so much as the fact that so many remain, Bear in mind, too, that with the bold disorderly life of

white men, came the white man's poisonous narcotics and intoxicants to again change and enfeeble the blood of the race. Mentally, too, the lower classes were probably debilitated by the oppression of their chiefs and the hard and unusual labors imposed upon them by their task masters. In the ruins and remnants of the *heiaus* or temples may we not read a record of lives lost and bodily constitutions wrecked. All this time the diseased and blood impoverished natives were living in their primitive manner in their grass huts, the general condition of which I have already described, and sleeping, the diseased with the healthy, upon one mat and under one *tapa*, or bark woven covering. A whole family, irrespective of age or sex, receiving from each other's heated bodies the disease-laden or disease-creating exudations. Surely I might almost stop here and claim that the diseased of the nation almost courted death by the conditions they had at first so unwittingly accepted and subsequently so unhappily carried out.

THE EFFECT OF THE TRANSITION PERIOD.

The next stage is the one that marks the unprecedentedly rapid transition of the Hawaiian race from so-called barbarism to Christianity and civilization, from the darkness of heathenism to intellectual life and physical death,—for the change has cost the lives of hundreds of thousands of souls. Let me say that I am aware that in presenting my views upon the source and partial cause of leprosy in the Hawaiian Islands, I am treading on dangerous ground from a medical and scientific standpoint, and am falling counter to accepted authorities, and furthermore am partially upholding the theory of spontaneity and syphilitic cachexia in connection with race-hereditariness and predisposition. I am willing to accept the responsibility in a degree, for I think the facts justify me in believing that each has had a marked influence on the disease on these Islands, and that the abatement of the disease depends to some extent upon their consideration.

I think that the advent of the foreign missionaries here, about the year 1820, may be conveniently accepted as the practical inauguration of the transition period. It is not within the province of this report to describe the noble works which they, and their successors of other creeds, have done in the way of educating our people. Their work, in this regard, justifies them. In promoting the health of the people by education in sanitary and moral laws and enlightening the mind of the Hawaiian generally, they have righteously followed the precepts of their Master. If, by the light of subsequent events, faults were made they must be attributed to an error of judgment, to the error of dealing with the Hawaiian race, in ignorance of the characteristics and history of the race, with too firm a hand, and too high a pressure propelling them on the road to advancement. In a word the should-have-been labor of a century was condensed into less than a generation of time. In so rapid a change in the life and character of an aboriginal race both mind and body must necessarily suffer. To partially clothe a naked race with uncongenial garments, worn in heated rooms and discarded as soon as possible, entailed upon the native race, a large number of constitution-weakening diseases, and more especially in cutaneous forms. Strictness of life in public gave way to hidden sin and deceit, and reticence of disease ensued for *fear* of disfavor or punishment. In lieu of the oppression of the chiefs came the more dreadful—to an aboriginal race—oppression of civilization. Foreign intercourse brought new and foreign diseases, and the pernicious body weakening customs and habits of foreigners. And all this time, too, fresh hordes of diseased men were propagating afresh with unhealthy women old diseases. The nation's strength had been previously sorely tested by epidemics which had swept away their tens of thousands in great swaths, showing that the once strong bodies had become debilitated. Small pox had been introduced into the land and claimed its victims by the legion,

measles and other fevers followed, and diseases which, under other conditions, would have lightly passed through the ranks counted their dead by the scores. The once prolific race had become sterile. Even the population of 142,000 in 1823 had in thirty years (1853) been reduced to 73,000, and in twenty years more (1873) to 56,000, or a loss of 86,000—or more than double the present population—in fifty years, and so they steadily died off. Is it a wonder that as the living think of their many lost friends they feel heart despondent and hopeless, and perhaps too regardless of the health of themselves and families? Is it to be wondered at that only the bravest and strongest did not become discouraged, and are not now as much weakened in mind as in body?

But there are two more causes which, in my judgment, have had a great effect in the propagation of leprosy, or diseases closely allied to it, although medically it be a disease *sui-generis*. The first was the ignorance of some of the early and unqualified medical practitioners who were permitted to spread disease broadcast, and to do irretrievable injury before retribution overtook them, but the second and chief cause was the indiscriminate, and to my mind careless vaccination that began about 1868. It is stated in the records of the Board of Health that a respected physician, now resident on the Islands was informed that "the usual price of 25 cents for each successful vaccination was to be reduced to 12½ cents, as some physicians, here in Honolulu, had vaccinated persons, and one of them 2,500 for a stipulated sum of \$75,—or 3 cents apiece and providing the vaccine virus apparently. Dr. Arning on page XLIV says in regard to this subject: "You are doubtlessly aware of the very prevalent opinion among medical men that the unusually rapid spread of the disease may possibly be attributed to the great amount of indiscriminate vaccination which has been carried on in these islands. There have, if my information is correct, unquestionably new centres of

leprosy developed after vaccination was practiced and several old inhabitants have told me, how they themselves used no precautions whatever in vaccinating during a small-pox scare, but brought the lymph directly from one arm to another without even wiping either points or lancet." As we have not yet discovered whether the disease can be conveyed by inoculation,* nor how long the germs thus implanted into the body may be dormant before becoming productive or destroyed, I can only state that the impression is strong in the minds of many that a number of cases have thus been inoculated with leprosy. As regards the experimental inoculation of Keanu, the condemned convict, a report as to his present condition will be found in the Appendix.

I will now consider the question of contagion in so far as, in my opinion, it bears upon the spread of the disease on these Islands.

THE CONTAGION OF LEPROSY.

I think that the evidence presented to you in the several reports of the Board of Health, and of the medical staff of the Government since the medical administration of Drs. Hoffmann, Hillebrand and Hutchison to that of Drs. Mouritz, Arning and others, and the, hitherto unpublished, cases to be found in the Supplement to this report, justifies the stand the Hawaiian Government has taken in believing that the disease, as it appears in this Archipelago, is to a limited degree contagious among the Hawaiian race provided there are strong predisposing and favorable conditions which create "a certain weakness to resist its attacks." That it is only mildly contagious, and then only under the most favoring circumstances, among the white races, is to my mind, absolutely proven by the fact that the cases of leprosy among the white population are so few in proportion to the number who have been brought into

* Vide Tracadie Report, page 142.

the closest contact with the disease, and I will repeat here views expressed on the dedication of the Kapiolani Home: "I have no hesitation in saying that the question (of contagion) is one that has a remoter interest than what is popularly entertained, especially abroad, inasmuch as while admitting that the malady is contagious under the most favorable conditions, yet it does not seem to be more so than many common diseases, the result of an impaired condition of blood, which are generally accepted as being non-contagious, and only become so through peculiarly favorable and strongly corresponding circumstances. Certainly there is nothing in the history of the disease, or attaching to it, to cause the foreigners visiting our shores, to be in the slightest degree apprehensive of danger." I think it can be asserted without fear of contradiction that there has not been a single case of leprosy among the white or foreign population that was not connected with long and intimate association with those of the native race either having, or predisposed to, the disease. The case of Rev. Father Damien, referred to in the reports of Drs. Mouritz and Arting, is the most interesting and valuable one in connection with the question of contagion. As far back as December, 1877, this faithful servant of Christ wrote to His Excellency J. Mott Smith, then President of the Board of Health, "I shall endeavor to do all I can for the benefit of the Board, and also of the sick people here. * * * You are aware *that for the general welfare of the lepers I have sacrificed my health and all I have in the world*, and in consequence you may trust me."

To those acquainted with the strictness and purity of life of such men as enroll themselves in the ranks of the Christian Army as true soldiers, and especially the men of the stamp and mould of mind of Father Damien, it is unnecessary to say that the inducements to the disease, too frequently met with among laymen, are wanting, and consequently the truly contagious and infectious elements of the malady may be more correct-

ly analyzed from his case than from any other. In his report the Rev. Father gives us but a modest and partial insight into the terribly trying life of 13 years among the lepers. Thirteen years in the closest contact with "a distemper so noisome, that it might pass for the utmost corruption of the human body on this side of the grave." Inhaling fetid breaths, cleansing the horrible ulcers, watching over the dying and handling the semi-putrid cadavers, living, eating, sleeping in an atmosphere polluted with disease, having his food cooked by a leper, and surrounded by such an aggregation of foulness, an escape from contracting the disease would have been regarded as miraculous. I think that this case taken in conjunction with the fact that the foreign portion of the community have been practically free from the disease is sufficiently conclusive to enable me to reiterate my belief that there is no ground for alarm for white people from the disease. The very valuable tables, prepared by Dr. Mouritz and others, which I elsewhere present to you, will I think convince you that we may at length hope that not only has this dread malady been checked and to a great extent controlled but that it is less virulent and malignant in character. I think we are justified in taking, in respect to the disease, a hopeful view of the future. Our duty though must be to closely watch the rising generation while we endeavor to ameliorate the condition of the sufferers. In dealing with this question let us, as Hawaiians, remember that we set an example to the world in the spirit with which we have treated the leper. The unfortunate has not been, and should not be, regarded as a mere outcast, as in other countries, whose life was an eyesore and a burden to the community, and whose death was desired. Even admitting that all attempts to cure this dread disease which has baffled the medical skill of ages have failed, yet we should not abandon our leprous brethren in despair; but we should continue to treat them and to care for them in a spirit of love and hope. Above all we should try to make the sufferers

as contented and comfortable as we can. If we cannot cure the disease we can at any rate alleviate the condition and pains of our lepers. I feel satisfied that in the improved condition of the lepers at the branch hospital since the Sisters of Charity were placed in charge may be found a suggestion upon which we may act in dealing with the disease on Molokai. With a better supply of water now assured, the course of treatment and the line of conduct which is apparently tending towards satisfactory results at Kakaako might be attempted on a larger scale at the leper settlement.

You will notice by the accompanying reports that I have furnished you with all the information I was permitted to obtain in regard to this disease and to its treatment in this and other countries. You will find the opinions of professional men frequently in conflict, but even in this divergence of ideas you may find much of value.

PRACTICAL WORK OR SCIENTIFIC INVESTIGATION.

After the somewhat costly experience, with practically inadequate results, in the purely scientific investigation of leprosy, I feel inclined, though with some reluctance, to urge the more practical method rather than the merely scientific. No one appreciates more highly than myself the interest and beauty of microscopical and technical research, and more especially when combined with possible practical results of vast importance to the health of the community, but on the other hand standing, with my colleagues, as a trustee of this Nation I feel it my duty to urge that expenditures for purely scientific research shall not be of the unknown and never-ending quantity, but in proportion to the value received by the Government and people and not merely to the individual making them. Leprosy has so far baffled science even among nations who can conduct their special examinations upon a grander scale than we can, yet there are results from these investigations of which we may make practical use with present,

if only temporary, profit and improvement to the suffering patients. It should be our aim therefor to devote our actions and legislation in this more practical direction. But we shall never do very much good as long as certain political elements regard this question of leprosy as a political factor in the control of service to the country. It must be regarded from a humanitarian and benevolent, and not from a political standpoint. The health and welfare of the people is our paramount duty and I feel assured it will be your greatest pride to promote. In ages past, when lepers were regarded with the greatest sternness and held in the greatest dread and abhorrence, the noblest examples of public and private benevolence have been provided for us. In the seventh century, merchants established in Jerusalem the Hospital of St. John where the Johannites attended upon the sick lepers, and a "little later," as Dr. Living informs us, "the remarkable society of the Knights of St. Lazarus was founded, in order that the lepers of higher classes might not be deprived of their knightly honors and fame. These knights were employed in superintending the leper hospitals and providing for the wants of the inmates." And still later on under the influence of religious orders, "kind and considerate treatment for the unfortunate lepers was strongly inculcated and consolations were frequently given; by some indeed they were looked upon as martyrs, and were treated with far more kindness and compassion than they now meet with in Eastern or even European countries."

The old historian Matthew Paris relates the following interesting story:—

"David, King of Scotland, the brother of Matilda, Queen of the English, came to England to visit his sister (in the year 1105), and when on a certain evening he came by invitation to her chamber, he found the house filled with lepers, and the Queen standing in the midst; having laid aside her cloak she with both her hands girded herself with a towel, and water being placed in readiness, she began to wash their feet and

wipe them with the towel, and taking their feet in her hands, kissed them with the utmost devotion. Upon which her brother addressed her thus: 'What is this which you are doing, my Lady? In truth if the King knew this, he would never deign to kiss with his lips your mouth, contaminated by the pollution of the lepers' feet.' And she, smiling, replied, 'Who knows not that the *feet* of an eternal King are to be preferred to the *lips* of an earthly one? Behold, it was for this that I invited you, dearest brother, that you might learn, by my example, to perform similar actions. Do, I beseech, that which you see me doing.'"

King Robert Bruce of Scotland, who was suspected of being a leper, founded near the town of Air a hospital for lepers. Then, too, let us bear in mind that Christ "moved with compassion, put forth his hand, and touched a leper, and said unto him, 'I will: be thou clean,'"

and immediately the leprosy departed from the man and he was cleansed.

OPPORTUNITIES FOR CHRISTIAN BENEVOLENCE.

In modern times true Christian benevolence plays an important part in the treatment of the lepers. Out of the sixteen leper asylums in the great empire of British India two are wholly supported by private charity and five partially so. Here, in Hawaii, also, we are not behind hand, for in the noble devotion of the Sisters at Kakaako, Father Damien's self-sacrifice at Molokai, the Queen's Hospital and Kapiolani Home we have a good nucleus of charitable work from which private benevolence may expand. In tending the sick, clothing the poor, and cheering up the downhearted, in providing for them little luxuries and making them more comfortable and contented, is a field open to all who understand their duties and have warm and courageous hearts. In this field experience shows that ladies inspired by Christian love are more courageous, or moved by a stronger faith than men, for they do not touch the sufferer with a hesitating finger but in the spirit of the

most devoted Christian charity, such as animated a Queen Matilda of England, or a Queen Elizabeth of Hungary, lay hands upon the outcasts to help them, and lighten their sad lot in life. The Sisters of Charity at Kakaako have completely, with their quiet but firm methods, revolutionized the condition of the lepers and in a few short months turned an abode of despair into almost a comfortable home; so that in the interest of the sufferers of this nation I pray that their noble example may be supplemented by a sympathizing co-operation from private sources.

▲Another matter that is within the scope of private benevolence, and a proposal in regard to which I recently made to a committee of gentlemen—appointed in Dr. Arning's interest—in the hope and desire that it would be accepted, is a more thorough study of the disease in the great foci of Molokai, wherein can be found every type and condition of the malady. What can be accomplished by a willing and conscientious man in a comparatively short time is patent to all who will study the reports and tables of Dr. Mouritz, the most complete ever furnished to this Government. The trouble hitherto experienced by the Government has been in obtaining a true resident physician at the settlement. While professedly zealous in the cause of true science and jealous of the claimed reputation of humanity, charity and love for the suffering, attractions of the capital have apparently been greater, among some of these professors, than the opportunity of enlightening the world and benefitting mankind. The true scientific student, like the Father Damien of religion, will go where he can learn the most and do the most good, and I feel assured that this honorable body will never be averse to assisting private benevolence in encouraging such men. Such men take their chances of loss of friends, and sometimes even of loss of health and life, but their fame and the beneficial results they bequeath to humanity are substantial rewards enough for them. The country wants for its

suffering lepers more noble men and women to attend to their needs, nurse and help them. It wants a cordial and charitable co-operation between people and Government. Their gracious Majesties and other members of the royal family have furnished bright examples of their love for these poor people and I trust there are many to be found to support them by good deeds. The sympathetic human heart, moving a soft and gentle hand, and a kindly eye ever bright and ready to cheer will go farther in the treatment of our decaying people than subtle scientific investigations carried on in a spirit of self-heartedness. The Hawaiian race is mentally depressed as well as physically ill and it is encouragement to the mind and heart that is required. It must be aided in the spirit of the Divine love which actuates the Sisters of Charity and their associates in charity all over the world, and not in the stern scientific methods of Faculties, whether of London, Paris, Berlin, New York or elsewhere. Hope and confidence must be inspired into the drooping hearts of our suffering people, and they must be nursed with love and kindly advice, as well as administered to scientifically or experimentally.

THE JAPANESE HOSPITAL TREATMENT.

In my general Health Report to the Legislature, I have called attention to the recent improvements made at the Branch Hospital, at Kakaako, in connection with the system of treatment adopted by Dr. M. Goto, but I deem it necessary, also, to refer to the subject here, as being one of more than ordinary interest.

Dr. M. Goto, after some experience with his father, Dr. Shobun Goto, of the Kihai Hospital, Tokio, Japan, in the treatment of leprosy, was invited to come to this country to give a fair trial to the Japanese hospital method of cure. This method had particularly attracted the notice of His Majesty the King during his visit to the Japanese Empire, and, through His Majesty's love for his suffering subjects, resulted in the invitation to Dr. M. Goto to pay his Kingdom a visit.

This treatment had already been satisfactorily tested by a gentleman, declared by medical men to be afflicted with leprosy, but who after a twelve month's stay at the Kihai Hospital as a patient, returned to this country in perfect health. The method may, in brief, be stated to be medicated warm baths accompanied with regular therapeutic and dietetic treatment, the details of which will be found to some extent in Dr. Goto's own report.

That the Doctor has, so far, met with marked success with the patients at Kakaako placed in his care is indisputable. I am enabled to state, from my own observation, that men and women, who were placed in his hands, with dead looking and badly marked skins, numbed and incapable of performing a healthy perspiratory function, have been restored to normal healthiness and action, accompanied with a new growth of hair upon parts formerly affected, with the texture of the skin made soft and smooth, eyes bright and clear, a lively sensibility promoted in the former numb parts and general health correspondingly improved. Foul ulcers have been cleansed and closed and helpless atrophied members again made active. After former experience in this direction of curative or palliative measures, I do not desire to speak too sanguinely, but it is, undoubtedly, the unanimous opinion of all those most interested—the patients themselves—that Dr. Goto's treatment has been attended with an apparent marked success never before observed on these Islands. There is evidently nothing occult or mysterious about the treatment, which is simply a combination of cleanliness, comfort, good nourishing food, and medical treatment with drugs, tonics and barks well known, but perhaps not sufficiently investigated and tested as to their merits, by the average medical practitioners. Perhaps in the stimulative bark of the *Æsculus Turbinata*, known to the Japanese as Hichyo and Tochi, there may be greater virtues than in any medicine hitherto used. It is no longer a professional secret, as a leading medical

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journal tells us, that, many of the most valuable formulas of the modern *Materia Medica* are derived from "old women's remedies," and others from, once-called, empirical nostrums. But, in no case should the successful result be attributed to medicine alone, for whatever may be the virtues of the remedies used, it is to the kindly and attentive physician, and the patient, watchful nurse that the true credit of healing mainly belongs.

The medicinal virtues of Dr. Goto's treatment are aided by his faithful and assiduous attention to the requirements of his patients. He is fortunate, too, in having to assist him the Sisters of the Hospital who carry out the physician's instructions with unremitting care and a kind attention. It is only a reasonable presumption that, under such circumstances, a system of treatment so patiently and thoroughly adhered to must result beneficially to the sick.

Is it not worth while even if we do not, for the present, dare to hope for an absolute cure—to strive to do as much as we can for our suffering countrymen; to restore the apparent bloom of health to the cheek; to brighten the eyes; to release the contracted muscles; to give back life and sensibility to the numbed flesh and limbs and enable the patient to feel more cheerful and hopeful? I am sure this Honorable Body will agree with me that it is, and, furthermore, that, in spite of the opposition of those who disagree with this special treatment, the success of Dr. Goto, so far, has raised in us the highest hope of greater beneficial results for our suffering people. But the result is only made possible by having faithful nurses to carry out the method of treatment.

THE QUESTION OF SEGREGATION.

This is a measure fraught with the deepest interest to a very large portion of the Hawaiian people. It is a question involving loss of liberty and separation from home and friends, to hundreds, nay, thousands, who have committed no offense against the laws of the country.

While recognizing the contagiousness of this dread malady under certain favorable conditions, and the fact that its first indications are hardly recognizable to the most observant eye, there can, I think, be no question that it is not contagious under casual circumstances. No contagion can arise from passing a leper on the street, sitting in the same room with him occasionally, or shaking hands, except, perhaps, that a broken skin might afford an opportunity for doubtful inoculation:—doubtful, as it has not yet been satisfactorily decided that the disease is inoculable. I feel inclined to believe that greater danger may arise from inhalation than from inoculation, and in this view I think I am sustained by some of the leading medical minds. But it is always wise to separate the diseased from the healthy and, especially, to break up that too close intimacy,—whether of family or otherwise,—which unfortunately, through want of knowledge on the part of Hawaiians, too often exists between the sick and the healthy. Hawaiians certainly are beginning to appreciate more and more the fact that it is wise that well developed cases of leprosy should not live with the clean and healthy, but they also feel, as I do, that the practice of herding all the sick in one place of exile is a hardship with doubtful results. If segregation can be carried out in ways, equally beneficial, but, more in harmony with the wishes of the people it should be done. While it is well for the community that a sufferer from any form of contagious disease should leave his home, it is hardly necessary to compel him to leave his native island. There would seem to be no valid reason why an experiment of local segregation should not be made in this regard on Kauai, as has been proposed, where a retreat has been selected and where families having a diseased member might there place their suffering relative and attend to his wants, and be nearer to him than if doomed to Molokai. The Government would be willing to provide any reasonable measures of relief as well as

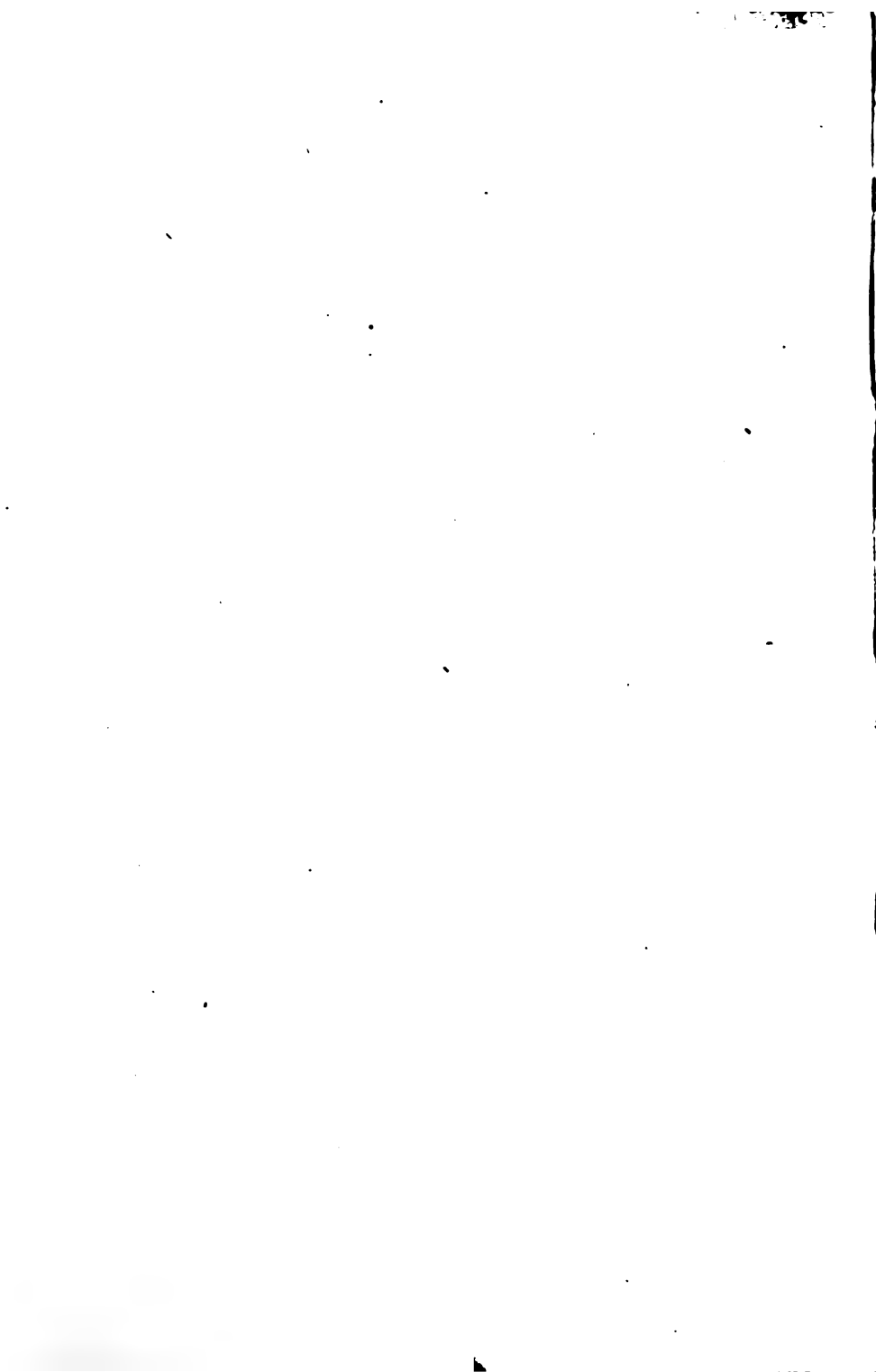
to furnish medicines. Where a community is found willing to voluntarily segregate its own sick and care for them, why should a government be called upon to expend large sums for a plan of segregation which can never be thoroughly carried out, bearing in mind the occult and mysterious nature of the disease in its long term of incubation and development?

And now in conclusion I beg to say that while I have endeavored to place clearly before you the very valuable information I have received, on behalf of His Majesty's Government, from foreign authorities on the subject of leprosy, I have endeavored to reciprocate on behalf of His Majesty the courtesies of other nations, to whom the Kingdom must, I am sure, feel grateful, by showing them the work that has been done in the past, and is now being done here. I am very well satisfied that where public spirit and benevolence has accomplished so much in our country, we shall not stand still but march on with redoubled effort, and with a hope and a trust that it may be Hawaii's glory to achieve such a control of this dread malady, the curse of all ages, that her name shall be honored among the nations, as a conqueror under the leadership of Love for all, Charity for the sick, and Hospitality to the stranger, the three great Marshals of the Grand Army of Peace.

. GOD SAVE THE KING!

WALTER M. GIBSON,

President of the Board of Health.



APPENDIX

— TO THE —

REPORT ON LEPROSY

— OF THE —

PRESIDENT

— OF THE —

BOARD OF HEALTH

— TO THE —

LEGISLATIVE ASSEMBLY OF 1886.



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TABLE OF CONTENTS.

	APPENDIX.	PAGE.
Queen Kapiolani's visit to Molokai, 1884.....	A	III
Report of Dr. Fitch.....	E	XVIII
Report of Dr. Arning.....	I	XXXVII
Correspondence between Board of Health and Dr. Arning	O	LV
Correspondence between Hon. C. R. Bishop, and others, in regard to Dr. Arning.....	U	LX
Circular Letter to Dr. Trousseau, and others, and replies thereto	H	LXIX
Special Report of Dr. Mouritz	K	LXXII
Biennial Report of Dr. Mouritz.....	L	XCIX
Special Report of Rev. J. Damien.....	M	CX
Report of R. W. Meyer.....	N	CXXIV
Special Report of Dr. E. Cook Webb on Kakaako.....	P	CXLII
Special Report of District Physicians and Dr. M. Goto on Leprosy.....	W	CLV

APPENDIX A.

*Report of Her Majesty QUEEN KAPIOLANI's visit to Molokai, by
H. R. H. PRINCESS LILIUOKALANI, July, 1884.*

TO HIS MAJESTY THE KING:

SIR,—I have the honor to submit the particulars of Her Majesty's visit to the Leper Asylum on Molokai whom, in obedience to Your Majesty's wishes, I accompanied thither. The steamer *Waimanalo* having been placed at the disposal of Her Majesty by Hon. J. A. Cummins, the party embarked early on Saturday, the 19th of July, 1884, leaving Honolulu at 3 a. m. and arriving at Waimanalo at 8 a. m. that morning.

The weather proving favorable on Monday morning, we left that port for Kalaupapa, reaching our destination in the afternoon. At 4 p. m. the party consisting of Her Majesty the Queen, Hon. J. Cummins and lady, who were in attendance upon Her Majesty; Dr. Edward Arning, M. D., and Mr. C. B. Wilson, Comptroller to my household, landed and were received by Ambrose Hutchison, the Assistant Superintendent, Rev. Father Damien, and Rev. Father Albert, who escorted the party to a house where a large number of the patients were assembled.

The Hon. J. A. Cummins addressed the people and stated the object of the Queen's mission among them.

Her Majesty then arose and with the usual salutation of "Aloha Oukou," briefly addressed them as follows:

"With love I greet you all. My heart-felt sympathy and that of His Majesty the King, your Father, is with you in your affliction. The King has sent His Sister the Heir Apparent, to accompany me in this mission, to show his love to you. I also bring to you the love of the people of Honolulu, the ladies and gentlemen, natives and foreigners, and those of the other islands who have assisted me in raising the necessary funds and contributions for your relief.

"I have been made familiar with your letters to me, and petitions to the Legislature, and whatever remarks you may have to make we will be pleased to hear them while we are with you.

"The principal object of this mission to your Asylum is to know your condition, and to render such assistance as may be necessary for your comfort."

The people were much moved with the Queen's remarks. The assembly standing during the address. At the conclusion of Her Majesty's remarks, Kailikapu made the following address, "Your Majesty, Your Royal Highness, and gentlemen, I must, first, on behalf of my fellow sufferers, express to you our warm and heart-felt feeling and thanks for this exhibition of your tender love and affection towards us, your afflicted people. I have been an old inmate of this Asylum and this is the second time I have been removed from Honolulu to this place, where I suppose I must remain like my afflicted fellows to linger out a miserable existence without a hope of cure; away from the comforts of home and the society of family and friends. Since my last removal to this place, by a close observation of the workings of the disease here, I have become thoroughly convinced of the non-contagious nature of the workings of the disease here. Instances are numerous here where men afflicted with the disease have been accompanied by healthy wives, who have lived with them, and nursed them for years until death, without the wife becoming affected by the disease, or in the other case the husband. Children, too, have been born of diseased parents and reared among the lepers, without contracting the disease; several such cases are among us now. Such being the case I cannot see how the disease can be called contagious or why we are segregated in an isolated place, where our most urgent wants are but poorly supplied. Poor food, insufficient as regards quantity, and want of proper care and nursing, are prominent among the ills of which we have to complain, and if the Government cannot supply these as they are supplied to us when at home, they should return us whence we came.

"Our rations consist of 21 lbs. of paiai, 7 lbs. of beef, and 1 lb. of sugar per week. Of this 7 lbs. of beef, 5 are often made up of bone. This is sufficient for one person only for three days, and the remaining part of the week he has to go without food. Those living at Kalaupapa have to travel five miles to get their rations, and there being no means of conveyance supplied, such as are too feeble to travel that distance, and have neither horses of their own to travel on, or friends to assist them, are often deprived of food. Many poor, disabled people too are unable, in their feeble and

mutilated condition, to prepare their own food after they have got it. When the rainy season sets in the streams would be swollen, and these feeble ones would sometimes be so exhausted that they were unable to cross the stream on their way home, and therefore had to wait until the storm and freshet subsided before they were able to cross. From this cause many have taken cold, and died in consequence.;

"An order for six dollars' worth of clothing is allowed per year to each patient, which they get filled at the store of the Board of Health. This is altogether insufficient. One woolen shirt and a blanket is all it will buy. On account of being thus poorly supplied with clothing, some die of cold, especially in the winter months. One great need also is wholesome water to drink and use for preparing food. Now we have to go three miles for water and pack it ourselves, and very often we are compelled to use the brackish water from a well near the beach.

"I will also speak of another matter—that is of the healthy children amongst us. Why are such children (many of whom are well grown, and without any sign of the disease about them) allowed to remain here and become patients through contagion? Why are they not taken elsewhere and properly cared for?"

The second speaker, Mr. Kahanapule, said: "Greeting to you our Queen, and to your Royal Highness and gentlemen: By the request of the patients now residing at Kalaupapa and Kalawao, I was selected from among their number to draft a petition in their behalf to be presented to the Legislature, now in session, in which was made a statement of our needs and a prayer for relief—a duty I was glad to perform. The confidence they have placed in me to act in their behalf, I now avail myself of on this occasion to make known to you what I believe to be our sorest needs; I speak in the interest of these people you now see around you, and more especially of those in crippled condition, unable to be present to meet you upon this occasion, and of those who would have joined with us in showing our appreciation of the great love you have shown to us in the willingness with which you have crossed the dangerous ocean to meet us, and hear our appeals and relieve our necessities. Our needs are many. Foremost among them is the necessity of clothing, some one with authority to settle our difficulties, and satisfactorily dispose of them. At present we have to submit without appeal to the arbitrary ruling of the Agent of the Board of Health, and

are often incarcerated for alleged offences in a summary manner, and without a hearing of the case.

"It is the desire of many of us that a resident judge should be appointed, who will always be present to hear and determine in a proper manner many of the little grievances between the members of our colony, and also be empowered to punish justly any offence against the peace and good order of our community. Our general superintendent visits us only once during each quarter of the year, and remains altogether too short a time to make such investigations as are necessary to the end of justice. Especially frequent are desertions in married life, and the annoyance suffered on this account is great. Many, to-day, amongst us are living in adultery because they feel secure in their removal from the reach of the law. With the general Government I have no actual fault to find, as every endeavor is being made to provide for our numerous wants; but I do blame the Board of Health for its laxness in carrying out a proper system of supplying those wants which have been liberally provided for by the Government. Our paiai, for instance, is landed at Waikolu Gulch, about five miles distant from Kalaupapa, and the patients of that part are necessitated to pack it themselves all that distance. This is a grievous task to many, while to those who are weak it is an impossibility. The place of landing, too, is so situated, and the road to it impassable, that in stormy weather travel there becomes actually dangerous, and at times pack-horses, together with their burdens, have been washed away and drowned, and men too have barely escaped with their lives. In such an event, those to whom the food belongs are necessitated to go without their supply until a new lot has been received. After the paiai is obtained many of the more crippled are unable to prepare it themselves, and can have no water to mix it with unless they are willing to use the brackish water near the beach, which is entirely unfit for any such purpose.

Those who prefer it may, in lieu of paiai, have 9 lbs. of rice and 7 lbs. of hard bread per week. They are compelled to make the change when the poi supply is short, or when they are unable to go that long distance for paiai. But such food is not satisfying, even when we have eaten our fill with other kinds of food we were not satisfied. Poi is our natural food, and nothing could take its place. Kokuas who help the patients have to be fed out of their rations, and when this is the case the weekly supply of food is not more than sufficient

for three days, and the unfortunate one goes part of the time hungry. Many of the patients have kokuas to prepare their food for them, otherwise they would, and sometimes even do, die of starvation. What the previous speaker has said in regard to the insufficiency of warm clothing and the number of consequent deaths is perfectly true. If the Government intends to keep us here, let the Board of Health be instructed to exercise a better care over our wants. Each of us has an allowance of \$6 a year."

Mr. Ambrose Hutchison, who is Under-Superintendent of the entire Settlement, said: "Being myself an employee of the Board of Health, I feel it my duty to uphold the actions of the Board where they are defensible, but at the same time I feel it my duty to my fellow sufferers here that I should speak plainly of matters as they are. I concur in the statements made by the previous speakers with reference to the food supply, and the mode of delivery. Their statements are not exaggerated. For those who are so crippled as to be unable to attend to their own wants a hospital is provided; but their prejudices against the institution prevent many of them from availing themselves of the comfort there afforded. Their dread of the place may be easily explained, when we take into consideration the fact that it was formerly a practice to send along with each patient, by the same conveyance, the coffin he was soon to occupy. Add to these things the fact that no proper care or nursing is provided, and the horror of the place so generally entertained by the patients is easily explained. The great want here is the institution of more approved nursing facilities. The hospital patients should be also supplied with better accommodation generally, and be provided with a more appropriate place in which to take their meals. If to such provisions were added that of a resident physician and an efficient staff of nurses, the main source of objection would be removed, and then they might enter the hospital willingly instead of avoiding the place as they do now. Could some Sisters of Mercy be induced to come up and remain among us, as is now the case at Kakaako, it would certainly be a great blessing. The nursing is now performed by kokuas who receive no pay, and whose heart is not in their work, and amounts to nothing so long as they attend to the wants of their own people. They go and come as they please, and patients suffer much from their neglect. One thing I would like especially to call your Majesty's atten-

tion to, and that is among us are a number of children born of diseased parents, who themselves are entirely free from all symptoms of the disease."

Taking in his arms a little girl about ten years old from the crowd, the speaker said: "Here is one of them, and there are here between fifty and sixty just such cases as this, and at various ages. These should be kept aloof from the diseased, and properly cared for in a separate asylum, and not be allowed to remain where the chances are of so many of them becoming patients by contagion. I would urge upon the Queen and the Heir Apparent to have this matter attended to, and to allow the weight of their elevated positions and the great influence they possess to bear upon the Board of Health, in order to bring about the realization of so worthy an object. In conclusion, I can only express my hope that this royal visit may be pregnant of future good, and may prove the harbinger of an improved moral and social condition among us."

Two other speakers followed in substantially the same strain as the two first speakers; one of them, a young man of the age of thirty years, spoke at length upon the proposition for the appointment of a resident judge, and told a piteous tale of the infidelity of his own wife, and his want of means of redress. He had no other complaints to make against the Board of Health. What was done for them was perfectly satisfactory, and they were all well provided for. A murmur of disapproval was at once raised, and interfered with the continuation of his remarks.

After making such visits as time would allow among the tenements of Kalaupapa, Her Majesty and company proceeded on horseback to the main settlement, arriving at about 7:30 o'clock p. m. There quarters were provided for the Royal Party by Mr. Van Geisen in a new house lately built for the special accommodation of visiting physicians. At supper the Rev. Father Damien was a guest.

After breakfasting on the morning of the 22d, the party, consisting of Her Majesty, attended by Hon. J. A. Cummins, Dr. Arning, Mr. C. B. Wilson, Mr. J. H. Van Geisen, and the under-superintendent Mr. Ambrose Hutchison began to inspect the houses of the patients.

In the first place visited there were nine patients, one of which was a very bad case. He had been twelve years at the settlement and nine in the Hospital; his age being about

60 years. Three were about the age of 30 years, and the remainder boys between 15 and 7 years of age.

To questions put by Her Majesty, they complained that their bedding, (only mats,) was too hard, their covering insufficient to keep them warm at night, and their food was neither properly prepared nor always sufficient in quantity. They complained also of neglect at the hands of the kokuas, to whom were detailed the work of administering their medicine and dressing their sores.

They also expressed their desire for the attendance of a resident physician who could prescribe for them in the many cases of inter-current diseases, such as bowel complaints and other troubles which were frequent among them. When questioned as to the conduct of the visiting physician, they said that his visits were so short, and his work so hurried that no practical advantage was to be derived from them.

In the second ward were ten patients ranging in age from 25 years to 70. Most of these cases seemed to be of the anæsthetic form of the disease, there being but comparatively little distortion of features. In the majority of these cases fingers and toes were either entirely wanting or in process of amputation, rendering the victims almost entirely dependent upon the help of others. Some had bound up their own ulcerated extremities themselves after a primitive fashion. To the question asked whether or not such ulceration could be healed, by appropriate treatment, Doctor Arning answered in the affirmative, qualifying the treatment, however, by saying that in some cases the healed surfaces might again take on ulcerative action, that being the natural tendency of the disease. These patients uttered the same complaint as those previously visited; but complained especially of the neglect of the kokuas and the difficulty they often experienced of getting a sufficiency of water regularly supplied them notwithstanding the fact that there was an abundance of water on the premises.

The third ward contained eleven patients, five of whom were 60 and 70 years old, three about 35 years of age, and the remainder between 17 years and 20. One aged 25 years had totally lost his sight, and all his fingers and toes. This result of the disease required him to be fed by another patient of the ward. Among those was the old man Nakahuna, well known to all old residents of Honolulu as a vendor of Hawaiian curios there a few years since. He has had the

disease about four years, and has been an inmate of the Hospital at Kalawao for three years.

Worthy of remark is the case of a woman named Kealahua, whom we met in this ward. She came to the settlement about 14 years since with her leper husband, who died there about seven years ago of the disease. She herself is robust and to all appearance without any symptoms of the disease about her, and is engaged by the Board to do the entire washing for the patients at the Hospital, at a salary of \$10 per month. She has been the mother of four children, one of whom died of acute disease without having developed leprosy, another of leprosy, the remaining two now living lepers.

The fourth ward contained ten patients, all of whom were women. Of these eight were between 19 and 30 years of age, and two about 65 years. Among them was a young girl of about 10 years who had accompanied her leper grandmother there. This, after a careful examination by Doctor Arning, was pronounced to be free of leprosy symptoms, and her removal recommended. The great complaint here seemed to be of the insufficiency of warm clothing and comfortable bedding.

The fifth ward contains two rooms, in one of which were six young men between 16 and 20 years, all of whom were inveterate cases. In the other room were two native boys and two chinamen. One of the boys was threatened with blindness from the disease. Insufficiency of warm clothing was also their complaint.

The sixth ward was occupied by one patient only, who was in the last stage of the disease. He was horribly deformed in features and his eyes totally blind. He seemed to be undergoing intense suffering and was muttering, throwing himself about in the wildest manner. Doctor Arning was called in and gave him a draught which seemed to give speedy relief; and at the end of half an hour he was sleeping quietly. Such cases as this prove the value a resident physician might often be.

In the seventh ward were four very bad cases. One in particular was noticed, where, though the face showed little disfigurement, the whole trunk was a mass of inflamed or suppurated tubercles which emitted an offensive smell unbearable to stand. In noticing this patient the Doctor observed that with proper medical treatment, such cases as

these might be greatly alleviated and a great deal of unnecessary suffering be prevented.

In the eighth ward were three boys, between the ages of 14 and 17 years, all bad cases. They seemed diffident and had no complaints and nothing otherwise to say.

The Lock-up was next visited. The building is about 10 by 15 feet in dimension, and contains two rooms about 6 feet long and 9 feet wide respectively. These are poorly ventilated by small iron gratings situated on the leeward side of the building. In one were two chinamen, both sentenced to one month's confinement on a charge of assault with a deadly weapon upon one of their countrymen. In the other was confined a native, named Makahui, sentenced for burglary in the store of the Board of Health, and abstracting therefrom money to the amount of about \$240, his partner in the crime one Naai by name, had terminated his own life shortly after sentence, by suspending himself from the gratings of his cell.

The cooking arrangements are commodious, cleanly kept, and convenient; a cooking range being supplied sufficiently large to do the cooking for 150 persons. The poi room is also spacious and clean.

As numerous descriptions of the settlement generally, and of the Hospital in particular, have heretofore been published, it will be unnecessary to give a further description. But here I may say that great credit is due to those in charge for the very neat and cleanly manner in which everything connected with the premises is kept.

After leaving the Hospital premises, the party next visited the store-house, situated not far distant from the Hospital and immediately across the road. Upon a close observation of the stores, all the articles provided appeared good, with the exception of the sugar, bread and salmon, the last mentioned article being so mouldy and soft as to be unfit for use; the sugar dark and dirty, of about No. 3 or No. 4 quality; and the bread tolerably good for medium bread, though inferior to that supplied to the Oahu Jail.

There are about 14 head of cattle butchered per week. Allowing (which according to the statement of some butchers is a large average) that each bullock weighed dressed, 350 lbs., and seven pounds per week of beef to an individual, the amount of beef slaughtered would supply only about 700 people; whereas, there are at the settlement, including the kokuas, a population averaging between 850 and 950 souls.

The arrangements for slaughtering are most primitive; and

the water supply insufficient for the cleansing of the meat. Arrangements, however, are now being made, whereby this defect will soon be remedied. A new reservoir is now in process of construction near to the place of slaughtering and designed to be filled from pipes connecting with the valley supply.

The next subject which engaged the attention of the party was an inspection of schools under the charge of the Rev. Father Damien. The buildings occupied for this purpose are supplied by the Board of Health, one of which is used for a boys' school and the other for girls, being situated in near proximity, and on the opposite sides of the roads. Both are within the vicinity of the mission church.

In the girls' school are sixteen pupils in all, ranging in age from 9 to 17 years. Among these was the young girl Luahiwa, of whom mention was made by Dr. Fitch in his late Biennial Report. Of all these scholars she bore the worst marks of disease. Out of these children there were four between 9 and 11 years of age who exhibited no external signs of the disease; but one, upon careful inspection by Dr. Arning, was declared to be in the incipient stage of disease.

In the boys' school were twenty-six pupils, all of whom were well marked with the disease.

The pupils of each school are separately lodged and fed. They are all either orphans or friendless, and are under the immediate care of Father Damien and a native woman named Kuilia, not herself a leper.

After leaving the school the party proceeded on horseback for the purpose of inspecting the old and the newly proposed sources of the water supply of the Settlement. The system now in use, and which has been so almost since the establishment of the Settlement, has its source in the valley of Wai-aleia. It is now recognized by the Board as inadequate to the needs of the place, and a proposition has been made to bring the water from Waikolu Valley—about two miles further on. Waikolu is the place where the paiai supply of the Settlement is landed and dealt out to the patients, being about three and a half miles from Kalawao, and five and a half from Kalaupapa. After traveling the road to this valley one is forcibly struck with the force of the universal objections made by the patients of the great distance they have to travel for their food.

The water supply here is abundant and never-failing, and capable of supplying the needs of a town larger than Hono-

lulu. The scenery of this valley is grand. The numerous cascades darting out in all directions from over the lofty precipices, the spray gracefully falling among the dense shrubbery and covering the green foliage as with gems of pearls. A sight seldom seen or surpassed in magnificence and beauty.

In the valley are several acres of land now lying idle which might be utilized, at a small outlay, in the cultivation of taro and other products for the use of the Settlement. The landing of two boat-loads of paiai during the sojourn of the party there afforded an opportunity of realizing the fact that a number of complaints, already enumerated, were not without foundation. The stream was so swollen by the rains which had been unceasing during our visit that, after a difficult landing had been effected, it was still more hazardous for the animals with their heavy packs, and they had to be forced to cross over the stream.

After staying in the valley for half an hour the party took the opportunity of inspecting a proposed new landing about half a mile from the Hospital, thence returning to Kalawao and visiting on the way every house to be seen. Most noted among the houses visited were the dwelling of Kaulamealani, Napua, Kuanea and Kii. The two last named individuals were pitiable objects indeed, and entirely dependent upon the friendly assistance of their neighbors for what help they received. Their fingers and toes were almost entirely gone with the disease. With suppurated hands and stumpy fingers they had improvised rude bandages for relief. Hospital accommodations and aid were clearly needed, but in reply to the question put to them, they said that they had a horror of entering the Hospital.

Her Majesty, as well as others of the party, was much affected at the touching sight of these two old women, utterly unable to help themselves, and promised every exertion on her part toward the removal of any objection that might really exist in the institution, and that efforts hereafter should be used to render the place attractive and not repulsive. As there was little time to spare, and as Her Majesty had promised to address the people of Kalawao before leaving, she bade the sufferers a kind adieu, and the company wended their way toward the settlement, arriving at the store where the address was to be given at three o'clock that afternoon. A large number of patients had gathered. Her Majesty proceeded to address them similarly as upon the previous occa-

of food and clothing, it might be advisable to increase the supply of the same, and to have the rations altered as follows:

- 4 lbs. of beef delivered twice a week,
- 15 " paiai delivered twice a week,
- 1 " salmon (for variety sake,) per week,
- 4 " mutton occasionally, in place of beef,
- 2 " sugar not darker than No. 2,
- 5 " salt per month.

I would suggest also a trial of canned meats, such as are put up in Australia for army and navy use, by way of variety as a substitute for beef, it might be found useful and economical.

1 bar 2 lbs. soap per month.

$\frac{1}{2}$ gallon illuminating oil per week.

In regard to clothing, it would be advisable to supply each person with a certain amount for day and night wear, in place of an allowance in money for that purpose, as at present. Many misuse their money, and suffer in consequence. It would be far better to allow each person two suits of woolen clothes a year and two blankets, the same as is done at the Oahu Jail.

There is no reason why a moderately large herd of beef cattle and milch cows could not be raised on the pasture lands of the settlement. The beef cattle could be kept for cases of emergency, when weather might interfere with the regular supply and the cows might be milked, more especially for the benefit of children and the sick.

In the two valleys of Waikolu and Waileia, there is much land uncultivated which would be suitable for the growth of taro, if it could only be utilized, which I believe is possible, if proper inducements were offered to cultivators.

It would be advisable that Waikolu should be abandoned as a place of landing, on account of the dangerous nature of the only road thereto; and that a boat landing be constructed near Kalawao. Such a plan is perfectly practicable and could be perfected with but little outlay. The road to the present landing place is for two miles of its length over lava rock, and overhung by craggy precipices from which frequent showers of stones are precipitated upon the road below, rendering travel dangerous to man and beast. A greater danger still exists in the frequent washing out of the road by the sea, making it on this account, in stormy weather, highly unsafe to travel.

There should be a better system adopted in regard to the kokuas than at present exists. So far as efficiency and reliability are concerned, the present plan of giving the work of the place to kokuas is a failure. It is not to be expected of persons going there as they do, merely to serve their own immediate friends or relations, that gratuitous work could be voluntarily performed by them for others, and any compulsion in this matter is altogether out of the question; and yet it is upon their general help that reliance has under the present system is to be mainly placed.

The support of every kokua means so much less in the way of food, rations and other necessities to every patient that needs their help, and the question of propriety in allowing so many healthy people to place themselves without restriction in the way of contagion, is one to be taken into consideration.

In closing these suggestions, I cannot help stating that the settlement as an asylum for these poor unfortunate creatures is decidedly the best place for them for a place of strict isolation and the condition of things are much better than that at my former visit in 1881.

The party slept on board the steamer which lay at anchor that night, and at 4:45 a. m. on the morning of the following day, left Kalaupapa for Honolulu, arriving at the wharf at 12 o'clock m., after a smooth and pleasant passage across the channel.

LILIUOKALANI.

APPENDIX E.

Report of DR. G. L. FITCH, 1884.

To the Honorable the President and Members of the Board of Health:

GENTLEMEN,—In this my Quarterly Report as Medical Officer in charge of the Leper Settlement, for the quarter ending Sept. 30th, 1884, I propose to thoroughly discuss the question of the contagious or non-contagious nature of Leprosy and its etiology.

Before expressing any opinion of my own, it will be proper to give the views held by others, who have made the study of the disease elsewhere, and so I quote as follows from the "Report on Leprosy by the Royal College of Physicians."

"The Committee having carefully considered the replies already received are of opinion that the weight and value of the evidence they furnish is very greatly in favor of the non-contagiousness of Leprosy.

"The Committee can only repeat the statement made in their former report to the College, that the replies already received contained no evidence which in their opinion justified any measure for the compulsory segregation of lepers."

Acting on the advices already obtained, the Duke of Newcastle forthwith issued a circular to the Governors of the Colonies expressing his opinion "that any laws affecting the personal liberty of lepers ought to be repealed, and that in the meantime if they shall not be repealed, any action of the executive government in enforcement of them, which is merely authorized and not subjoined by the law ought to cease."—*Handbook of Treatment—Aitken.*

Doctors Danielssen and Boeck state, "that among the hundreds of lepers whom we have seen daily, not a single instance has occurred of the disease spreading by contagion. We know many married persons, one of whom is leprous, cohabiting for years without the other becoming affected. At St. George's Hospital many of the attendants of the inmates have lived there for more than thirty years and are quite free from any trace of the disease. * * * As the result of our observations we

have only to deny the contagiousness of leprosy."—*Coll. Phys. Report, p. 4, XIX.*

JAMAICA—

"I am certain that it is in no way contagious and that it is not transmissible by sexual intercourse. The evidence against the contagion of leprosy in all its forms is IRREFRAGABLE."—*Dr. Fiddes.*

BARBADOES—

"I have not met with any cases of contagion, none of those in attendance during the last nine years upon the inmates of the lazaretto have contracted the disease and I, after receiving a wound from a knife, moistened with the fluids of an inmate, have escaped, although the wound was followed by great constitutional irritation and loss of the finger. From what I have heard I do not believe it communicable by sexual intercourse."—*Dr. Broune.*

MYTILENE—

"It is demonstrably not contagious. Dr. Bargilli practised inoculation in two instances, but without results."

CRETE—

"There are 127 persons who have all lived together healthy among lepers for many years."—*Dr. Brunelli.*

MAURITIUS—

"Never did I know two instances where medical men have wounded themselves in dissection but without any bad results."—*Dr. Powell.*

BENAYEO—

"All the reporters agree in stating that leprosy is not contagious, nor transmissible by sexual intercourse."—*Dr. Dunbar.*

NAGPORE—

"During the nine years I have held charge of the Nagpore goal, with the daily average of 500 prisoners, all of whom freely intermingled, and some of whom when imprisoned were lepers, I have never known an instance of contagion. * * * As far as I could ascertain the disease does not seem transmissible by sexual intercourse."—*Dr. Hende.*

NEW BRUNSWICK—*Coll. Phys. Report, pps. XLIII, XLIV, XLV.*

"I am thoroughly convinced that the disease in Tracadie is not contagious, and that it is not transmissible by sexual intercourse. All the cases I have reported prove its non-contagiousness. Leprous husbands have lived many years with their

wives, and *vice versa*, without infecting each other. Children have been born of leprous mothers, and have been nursed and handled by patients in the Lazaretto in all stages of the disease, without manifesting any symptoms of the disease."—*Dr. Bayard*.

"It does not seem to be transmissible by sexual intercourse."—*Dr. Gordon*.

"I have never met with an instance of leprosy being communicated to a healthy person by contagion. On the contrary we have a female, who, for the last six years has scrubbed the floors of the hospital, washed their clothes, ate, drank and slept with those affected, and who, notwithstanding, exhibits no trace of malady, and at present enjoys good health.

"Leprous husbands have, for many years, slept with their wives and families, and wives with their husbands, without contracting it. Children have been born of leprous mothers in the last stages of the disease and have been nursed by lepers, and have now attained adult ages without manifesting any symptoms of the disease. All of which proves it not to be transmissible by sexual intercourse."—*Dr. Nicholson*.

"Several lepers have cohabited with their wives for years and no infection was communicated to them. In the case of a leprous man now in the hospital, the wife has continued free, although two of seven children which she has borne to him are afflicted with the disease."—*Dr. Benson, Coll. Phys. Report, p. 4*.

William Aitken, M. D., etc., etc., says in his recently issued "Handbook of Treatment," p. 238, A. D. 1882:

"LEPROSY ; TRUE DEFINITION.

"A constitutional non-contagious hereditary affection. * * * There appears no more need (or just about the same) for restricting the liberty of lepers as for restricting the liberty of those afflicted with the gout."

Under the heading

"A CASE OF INDIGENOUS LEPROSY,"

in the Medical Record of August 16th, 1884, W. H. Greddings, M. D., of Aiken, South Carolina, U. S. A., says: "Isolated cases of leprosy have been observed in Charleston and its vicinity for many years, the present being the latest of a series of twenty, that have been brought to my notice during the last twenty-five years. * * * In none of these cases was the disease hereditary, although in one instance a mother and daughter were affected at the same time. In all these cases except the one just mentioned there was not the slightest evidence of contagion, nor has it ever been deemed necessary to isolate

those affected with the disease. When well enough they walked about the streets of the city, attracting but little attention, as the people know from experience that in this country they run no risk of contracting the disease by coming in contact with those affected with it

"As isolated cases of leprosy have been observed on the coast of South Carolina, for nearly forty years, without any apparent increase in the number of cases, it may be safely inferred that there is but little danger that the disease will ever become endemic in this section."

A. Balmano Squire, M. D., of London, says: "Greek Elephantiasis was formerly thought to be contagious. It has, however, long been satisfactorily ascertained, that it is not so."—*Reynold's System of Medicine*, Vol. 3, p. 948, A. D. 1880.

Thomas Hawkes Tanner, M. D., F. L. S., of London, says: "*Elephantiasis Græcorum*, or *Elephantiasis Anæsthetica*, or the *Eastern Leprosy*, is a terrible and dangerous constitutional disease, being endemic and affecting the poor and badly nourished in preference to the well fed, while it is non-contagious, hereditary and generally incurable."—*Practice of Medicines*, Tanner, p. 671.

"That leprosy in Japan is not in the slightest degree contagious or infectious; that the idea to isolate lepers from other patients does not occur to anybody. In my own wards I have always had lepers between other patients, everybody knowing the nature of the disease, but no one objects to the sleeping in the bed next to theirs. No disinfection is ever used. There is a native Doctor in Tokio, in whose family the treatment of leprosy has been carried on as a specialty for at least three generations, he and his whole family live in the same house with his leper patients. For a hundred years, many, many thousands have been treated in that very same house in the center of the capital inhabited by more than a million of people and never one case of contagion has happened."—*Dr. Baelz, Prof. of Chemical Medicine at the University of Tokio, Japan*, (on board the steamer *City of Tokio*, Pacific Ocean, September, 1884.)

Dr. Baelz is one of the best and most favorably known physicians of the Orient. The above quotation is an extract of a letter from Dr. Baelz to Rev. S. C. Damon.

A recent visitor at the Lazaretto in Tracadie found the Mother Superior of the Sisters of Charity, who have charge of the Lazaretto, with her hands in the same basin of water with those of a leper, whose hands were covered with leprosy ulcers. She, the Mother Superior, was cleansing the ulcers preparatory to dressing them. There are nine Sisters of Charity at that Lazaretto who have lived there for fifteen years, engaged as nurses

and caring for lepers; none of the Sisters have contracted the disease.

My authority for this statement is Rev. Father Lenor, Provençal of the Catholic Mission in these Islands. (Verbal communication.)

The following quotation is from a recent newspaper article which, from other sources of information, (on the Etiology of Leprosy, by G. Armaner Hansen, Assistant Physician to the Leper Hospital at Bergen, Norway,) I believe to be a true statement:

"In a report given a few days ago by the head physician of Norway, for the cure of leprosy, it is shown that by the end of 1856 there were known in Norway 2,863 cases of leprosy, of whom then but 235 were treated in hospitals, and 2,628 in their houses. Since then there has been steadily more isolation, and thereby a steady diminishing of new cases, so that by the end of 1866 there were 2,704 cases, and of these 795 were in hospitals, and 1,909 in their houses; a decrease of 159 cases. By the end of 1876 there were 2,008 cases, showing a decrease of 696 cases.

"Since the decrease has been regular; thus there were known, in 1877, 1,923 cases; in 1878, 1,853 cases; in 1880, 1,582 cases; of whom 617 were in hospitals, and 965 in their houses. Thus the decrease of this disease is from 2,863 cases in 1856 to 1,582 in 1880; in all 1,281, or 45 per cent."—*Hawaiian Gazette*, March 10th, 1883.

Summing up this statement it will be seen that, beginning with 1856, we find one case in twelve, or a little over, segregated, and 2,628 different foci of contagion—according to those who believe in contagion—engaged in spreading the disease, and yet the disease begins to decrease, so that with a gradually increasing number of cases segregated—or rather varying in number, for in 1866 seven hundred and ninety-five were segregated, and in 1880 only six hundred and seventeen,—by 1880 45 per cent. of the disease disappears, but still about three-fifths of the cases are at large. It has been asserted, however, that those who were living in their homes were carefully segregated.

Drs. Danielssen and Boeck say: "In Norway most of the cases of leprosy occur among the very poorest classes of the inhabitants, and especially among those living around the shores of the deep bays or fiords on the West Coast. The huts of the people generally are of one low narrow room, in which all the family live, with a small window that is not made to open, are usually planted down in a damp site, and surrounded by filth." *Coll. Phys. Report*, pp. LXVII.

How to make these facts agree with the assertion of the advocates of contagion in Hawaii, who so eagerly assure us that all

the cases here originated from one imported case—a Chinaman, many years ago—and that the disease has all spread from that one case, is a matter entirely beyond my comprehension. As we shall see further on, there is no evidence in favor of such a statement whatever.

As is well seen, the evidence of observers in other lands, who have been brought into intimate contact with the disease, and have really investigated the matter, seems generally opposed to the doctrine of contagion. Those like Dr. J. C. White, of Harvard University, who has seen one case—(*Am. Journal Med. Sciences*, p. 447, 1882—or Dr. J. R. Tryon, of the U. S. Navy, who, during a visit of some week's duration here in Honolulu, visited the Kakaako Leper Hospital three times—and in the *American Journal Med. Sciences*, April, 1883, is very sure of the contagious nature of the disease; and various observers elsewhere, who have examined the disease at a secure distance, are equally certain of it; but real, practical, earnest workers in the field, like Drs. Danielssen and Boeck of Norway, with their forty or more years of experience, say: "Among the hundreds of lepers whom we have seen daily, not a single instance has occurred of the disease spreading by contagion." * * *

"As the result of our observations we have only to deny the contagiousness of leprosy."

And now let us turn to what we can find here in Hawaii to help us form a conclusion on the subject.

In the March number, A. D. 1883, of the "Medical Bulletin," published in Philadelphia, I find this statement by J. V. Shoemaker, A. M., M. D.:

"I am indebted to Professor Samuel D. Gross for a recent opportunity of seeing and examining a young man suffering from leprosy. The patient was sent from Honolulu to Professor Gross by Drs. Hagan and Trousseau, gentlemen who are well known in the Sandwich Islands as expert practitioners of medicine.

"The letter of introduction, and the description of the patient's condition, stated that they believed the case in question to be one of leprosy; and, as they regarded it non-contagious, they advised a trip to the States for a change and benefit to his general health, and wished him at the same time to have the best medical advice that this country could give."

That Drs. Hagan and Trousseau did, at that time, believe that leprosy was non-contagious *must* have been the case, for it is entirely inconceivable that any man, and certainly any medical man, would send a person suffering with a disease that they believed contagious, to infect a healthy community; yet how to reconcile this matter with the statement in the following card,

published in the *Hawaiian Gazette*, under date of May the 23d, same year, is beyond my ability.

“DOCTOR MATHES ENDORSED.”

“*Editor Gazette*.—We have read with pleasure the article of Dr. G. L. Mathes in the *Saturday Press* of May 15th, in which he ably sets forth the difference between syphilis and leprosy, and in which he gives the views of the great pathologists and eminent medical investigators of the present day.

“We cheerfully express our high appreciation of the article, and fully endorse the writer’s views in regard to the non-identity of the two diseases. Moreover, with a knowledge of the introduction and spread of leprosy among the people of these Islands, we believe the disease to be eminently contagious.

“As to cure, we regret to say, that nothing is yet satisfactorily established, although modern scientific investigation in different countries is tending to establish greater hopes in that direction.

“Such being the case, we recognize segregation as the only means left us to rid the country of the disease. While we realize the severity of such a measure, and do most heartily regret the necessity of its enforcement we cannot but feel that it is the only thing left us.

“Better to amputate a diseased limb, than through a false sense of tenderness to allow it to remain and gangrene the whole body.”

“G. TROUSSEAU, M. D.

“J. S. MCGREW, M. D.

“J. BRODIE, M. D.

“N. B. EMERSON, M. D.

“M. HAGAN, M. D.”

Cases of foreigners who have been on terms of close intimacy with lepers, for several years here, have come under my own observation, as follows :

EXAMPLE 1. A young white man A, over thirteen years ago, began illicit relations with a married native woman. Fifteen months passed, during which time he visited the woman two or three times a week, and then he discovered the woman was an advanced case of leprosy. He left her for three months, greatly frightened, then thinking that if any damage could result to himself, it must be already past remedy, he went back to the woman, whose husband had by this time forsaken her, and slept in the same bed with her, for eighteen months longer, when the woman was arrested by the police and sent to the leper settlement, where she shortly after died with the disease.

A has been living with another woman, non-leprous, for the last ten years and he shows no sign of leprosy.

EXAMPLE 2. A book-keeper in a house here, B, began illicit relations with a young native girl nearly six years ago. Two years later she developed leprosy, and after about two years more had passed she was removed by the police to the Kakaako Leper Hospital here. B is hemiplegic as I believe from syphilis, but is not a leper.

EXAMPLE 3. C, another white man, married a native girl over twelve years ago, after one month of married life they separated and did not meet again for seven years; when C picked her up on the street one night, not knowing her, and spent the night with her, and as he expressed it to me, was much disgusted in the morning to find he had spent the night with his lawful wife. Shortly before the meeting of the Legislature of this year, one of the white members who had picked up the wife of C, took her to a physician and was at once informed she was a leper, and inquiry revealed the fact that she had been so before she married C. I do not know positively how long the woman had cohabited with her lover, but believe it to have been a considerable period. Nearly three years ago she had procured a divorce from C, and in 1882 C married for his second wife another leper woman; she died March 31st, present year, and before two months C married his third leprous wife, with whom he now lives at the leper settlement, but he is not a leper, on the contrary he is a remarkably vigorous man of 45 years of age. For over two and a half years C has eaten the food cooked and prepared by lepers, his washing being done by a leper woman, and most of the time he has eaten at the table with an average of four cases of leprosy.

EXAMPLE 4. A planter, D, on one of the other islands took a young married native woman away from her husband more than eight years ago, she was a leper at the time, and D lived with her for seven years, then brought her to me a most disgusting creature. She shortly after died in Kakaako. D is a fine healthy looking man and shows no sign of leprosy.

EXAMPLE 5. An aged white man on Maui has fifteen children born of his native wife. Fourteen of the children are alive and well, and so is he except for the infirmities of age and drink. His wife has been a leper for the last ten years. They continue to live together.

EXAMPLE 6. A white man E, formerly a Captain of a schooner, married his native wife ten years ago. For the last six years his wife has been a leper, and I saw her two years ago, when there were leprous ulcers on her arms nearly as large as the palm of my hand. He assured me at the time that he was co-

habiting with her as usual. She is now a resident at Kakaako. He is a non-leper.

EXAMPLE 7. F, a native of Guam, married a native woman here six years ago, for four years she has been a leper. He is not. They still live together.

EXAMPLE 8. G, a Hindu, had a son by his native wife, now 29 years old. His wife had been a leper for about five years when she was sent to the leper settlement in 1873. G is not a leper.

EXAMPLE 9. H had led a most licentious life, he and his wife were both born here of white parents. At 42 years of age, after thirty-six hours of intense headache he became hemiplegic, left side; he avers that at no time was he unconscious during his attack. He has five children by his wife. The first a girl, in July, 1882, had a thin, weazened expression of countenance, was a great sufferer from long continued headaches; had marked swelling of post cervical chain of glands, and also both epitrochlears. The second child, before arriving at eight years of age, began to lose the use of left hand. When I saw the case, at the same time as the first child, the patient was 16 years old. Marked swelling of post cervical and epitrochlear glands as in the elder child. Hand withered away until it was no larger than the hand of a child of six years; and was anæsthetic and analgesic. Over the left pectoral region was an oval white patch surrounded by a bronzed oreola analgesic in the white petion. Over the thigh was another of the same spots, each of these places were about three inches in their longest diameter. There could be no doubt that this was a well marked case of leprosy. The next child, younger, had only slight swelling of the glands, and the younger ones were apparently healthy. The leprous child was and has been going to school, and no distinction and no segregation had been made with this child any more than with any of the other children. But this alone was a leper of the entire family although they had had eight years to contract it in from this child if it were contagious.

EXAMPLE 10. I, a Portuguese, came a few days ago and begged me to let his native wife out of Kakaako and he would take her home and take care of her. She had been a leper for four years during which time they had cohabited as man and wife. She is one of the worst tubercular cases of leprosy in Kakaako, but I is a burly powerful man showing no signs of the disease.

EXAMPLE 11. J, another Portuguese, has had six children by his half-caste wife. She had been a leper for two years, her husband was drowned, a short time ago. J was not a leper,

EXAMPLE 12. K, another Portuguese on King street, has a

leprous native wife in Kakaako. She has been a leper for two years. K is a healthy man.

EXAMPLE 13. L, son of a merchant, deceased, took his leprous leman over to the island of Lanai nine years ago, and lived there with her for a year, when she was arrested and sent to the Settlement, and now L is married to a clean woman, and neither he nor his wife or children are lepers.

EXAMPLE 14. M, a native of Guam, became a leper seven years ago; four years ago his native wife died with typhoid fever, a non-leper; she had one child by him, who is now six years old, a non-leper. Shortly after his native wife died he married a Portuguese woman, a widow, who had one child by her first husband, and by her leprous husband she has had two. M is the only leper of the family.

EXAMPLE 15. N, the leper whom Drs. Hagan and Trousseau sent to Philadelphia. (Quoting again from the *Medical Bulletin*.) "Eight years ago, having felt poorly for a time, he noticed a dead spot of skin just above the knee. It spread slowly, and was only just about twice as large four years after its first appearance. Six months later he married a healthy native woman, and a weak puny child was born to them within a year, which lived only a short time." Wife is a non-leper.

EXAMPLE 16. O, the captain of a vessel here, died five years ago insane, a non-leper, although he was the father of two children by a leprous woman, Annie Aiwa by name. After O died, Annie married a man by the name of Mahiki, by whom she has had three children; the children by both men are all dead, none living to be more than three months old. Mahiki is non-leprous, although fully two years ago I saw Annie's back and limbs one mass of leprous ulcers, which afterwards healed up. Her last child by Mahiki died in September this year, aged six weeks. Annie has been a leper she says for about fourteen years.

EXAMPLE 17. P, a painter here, has been married to a native woman who is a leper for four and one-half years. P is not a leper.

This list embraces every instance where foreigners, exclusive of Chinese, have lived with lepers which I have seen personally. I have heard of a large number of other cases, and the result is the same. Not a single instance of contagion, or the development of the disease has occurred among these cases, or in any of the cases that I have only heard of and not seen, among those who have been known to cohabit with lepers, except those which are doubtful. A white leper at the settlement said he had had a multitude of native mistresses, and probably some of them may have been lepers. Another white man at the settlement said he had a native wife many years ago who had red spots on her, and

large sores. This may or may not have been leprosy. Counting these two lepers just mentioned, I have had nineteen white people under my care who had leprosy. I have carefully questioned all but two of them as to whether they had lived or been on terms of intimacy with lepers; all except the two whom I did not question, and the two whose statements I have already given, denied any relations with lepers, and most of them deny ever seeing a case until they were declared lepers themselves. The two whom I did not question were these: An aged Portuguese, with whom I could not converse, through inability to understand each other's language, and the first case I saw, which was shortly after I arrived in the Kingdom, and before my attention was called to this matter. Of course, the entire nineteen may have been exposed many times to the disease; for I doubt much if one out of fifty among all the physicians of the world would recognize the first case of leprosy they should see, unless it was a pronounced case. It is frequently a difficult matter to decide positively whether a person is a leper or not. There have been several cases here lately in which physicians, thoroughly familiar with the disease, were unable to agree, or come to a definite conclusion.

Turning back to instances, on June 24th, A. D., 1882, while engaged in making a post-mortem examination of a boy who had died with leprosy the day previous, I scratched my wrist on my sleeve button and did not discover the wound until it had been covered with blood from the boy's body for a full half hour. I have never experienced the slightest bodily inconvenience from the wound. Some months ago, I regret I cannot give the exact date, Dr. E. Arning inoculated his finger while making a post-mortem examination of a leprous cadaver. I called his attention to a scratch on his finger, just as he was about to begin the operation, but he took no precautions, and as a consequence, his arm shortly afterwards swelled clear to his body, and he suffered severe constitutional disturbance, but he has not developed leprosy.

Turning now to native cases. Kauulei, a mail carrier on Mo-lokai, had the palmer surface of the third finger of his left hand bitten out by a leper six years ago. He is not a leper.

Geo. Naea, the husband of Queen Dowager Emma's mother, was a leper, as early as 1845, and died in 1854 with leprosy. His wife survived him until October, 1880, and then died a non-leper. In 1845, also a man by the name of Honolulu, became a leper and died with the disease about 1862. His wife Mele now lives at Moanalua a non-leper. The first case of leprosy as far as I can find out which attracted public attention here was a man by the name of Ahia. He was a hulumanu or member of

the body guard of Kamehameha III. His case was well known as early as 1840. He died with leprosy in 1856. His wife died in 1860 a non-leper. A woman by the name of Lilia now lives at the leper settlement, she went there with her husband, a leper, in 1870. He died and Lilia married leper number two. He died and Lilia married leper number three, with whom she now lives. Her son by her first husband has developed leprosy, but Lilia is a fine looking healthy woman. Kalehua, a woman, went with her husband, a leper, to the settlement in 1868. He died, and Kalehua, in addition to living a most licentious life with the inmates of the hospital, lepers in the last stages of the disease, is also the hospital laundress, having done the washing of the blood and pus saturated garments of the inmates for upwards of ten years, but she is a remarkably fine looking healthy woman, showing no trace of the disease. Kua, saddler and shoemaker at the settlement, was this month married to a leprous woman. He has married three leprous consorts, the first having been a leper over sixteen years ago. He is not a leper, but has been a severe sufferer from syphilis since I have had charge of the settlement.

In 1860, Nahuaae, male, died with leprosy. His widow, Mele by name, at once began illicit relations with a man by the name of Kalalau. At the end of three years he forsook Mele and married a sister of Nahuaae, Holomakini by name. Holomakini tells me that while Kalalau was living with Mele, he contracted sores on his penis, from her presumably, and after a time his eyebrows fell out, and in 1868 he was declared a leper, and sent to the settlement, his wife going with him. After a time he died and Holomakini married a man at the settlement, who was not a leper, and he died with some dropsical affection. Then Holomakini chose for her third husband John Lui, a leper, and he died with the disease in March, present year. Holomakini is non-leprous, but has been a severe sufferer from syphilis contracted as she avers from her first husband Kalalau.

Now turning back to Mele, after Kalalau forsook her, she consoled herself by leading a promiscuously licentious life for several years, but finally settled on a man by the name of Kamai, who tells me that he had syphilis years ago. In 1878 he was sent to the settlement a leper; shortly after his arrival there he picked up a woman. Kaahumanu by name, with whom he still lives. She is a non-leper.

Once more turning back in our history to Mele, after Kamai was sent away, she married a man by the name of Oalamahia. He said he had syphilis before he married Mele. In 1883 he followed Kamai to the settlement, and now Mele is living with a white man on Hawaii. She had children by Nahunui, but

they all died, none by Kalalau, two by Kamai, both dead, and two by Oalamahia, both living. So Mele conceives by three lepers and buries her first leprous consort twenty-four years ago, but she is not a leper.

In 1838, Kamuli, a woman, went from Kilae, Hawaii, to Koloa, Kauai, and returned in 1841 to Hawaii a leper. None of the rest of her family developed leprosy, and a number of them are still in the same land where she lived and died a leper.

Naihi, a boy aged ten, had, three years ago, a large leprous ulcer on his cheek and another on his upper lip. His finger and toe nails were dropping off, and the ends of his toes were raw sores. One day I found him lying with the ulcer on his cheek in contact with the bare arm of his foster mother, both of them covered up with a blanket so that no part of them was exposed. The blanket being over their heads, of course the mother must have been breathing the same air several times over that the leper boy had expired as well as the emanations of the leprous ulcers. Yet she is not a leper to this day.

In 1857, Mikona, a native, married Caroline Green, a half caste. Mikona was a leper when they married. Four children were born to them. The first two, as they arrived at the age of puberty, became lepers, the third is now a man grown and the father of a family; he is not a leper. The fourth child developed leprosy at about six years of age. Mikona and his three leper children are buried at the leper settlement. Before he went to the settlement his wife Caroline had a lover to whom she was granting her favors, his name is Kamaiopili. After Mikona was sent away Kamaiopili and Caroline inter-married. As a fruit of their union, there are three children; one boy, and two girls. Neither of these children, Kamaiopili, or Carrie are lepers.

Yet Caroline married a leper thirty years ago, lived with him sixteen years, had four children by him, three of whom developed leprosy; and now has three children by another man, who, if report (which she does not contradict, as I heard her talking on the subject) be true, was cohabiting with her, turn and turn about with her husband, and yet Carrie, this man, and their children escaped.

In fact, I might continue this narrative giving date, place and circumstance of hundreds of cases that I have collected, but I will continue the evidence in another form.

It is a well-known fact that leprosy exists in a large percentage of the native race. Estimating the entire native population of pure blood at something over 40,000 and total number of lepers at 1,800 would give us four and a half per cent. at any one time. I base this estimate on the fact that on Oct. 9th,

there were 723 lepers at Kalawao settlement and 180 at Kakaako leper hospital, and from information from different portions of the kingdom, in answer to inquiries I have made.

Drs. Danielssen and Boeck state, "That the average duration of the tubercular form among the patients in the hospital at Bergen, from 1840 to 1847, was between nine and ten years, and of the anæsthetic form, among the same, was between 18 and 19 years.—*Coll. Phys. Rep. p. LXV.*

Sept. 30th, 1884, we had at Kakaako hospital 67 married males and 36 married females, that is where either sex were, or had been, married. One married couple were in the hospital, and of the rest, three of the males had had leprous wives, and one woman a leprous husband.

No larger number of persons became lepers from inter-marriage with lepers, than in the community at large, as these figures plainly show.

Presenting the evidence in another form. The Leper Settlement at Kalawao was inaugurated A. D. 1866. Since which time up to the 1st of April this year, 2,864 persons have been consigned there as lepers. Oct. 9th I made a careful census of the number of the children alive who were born at the settlement, and where either or both parents were lepers before the birth of the child.

The total number was twenty-six, as follows :

MALES.

<i>Name.</i>	<i>Age.</i>	<i>Parents.</i>
Kalani.....	8 years.....	Mother Leper
Mahai, (is a leper).....	14 years.....	Father Leper
Keoloewa (brother of Mahai).....	11 years.....	Father Leper
Kukelaile.....	4 years.....	Mother Leper
Kalaniuli.....	2 years.....	Both Lepers
Samuela.....	21 months.....	Mother Leper
Joe Kanaana.....	4 years.....	Both Lepers
Kunihi.....	3 years.....	Father Leper
Kahema.....	2 months.....	Mother Leper
Keoni.....	9 years.....	Father Leper
Damiana.....	9 years.....	Mother Leper
Keahimu.....	9 years.....	Both Lepers
Opupeli.....	10 years.....	Father Leper
Joe.....	8 years.....	Both Lepers
Total, 14 boys.		

FEMALES.

Keneki.....	2 years.....	Mother Leper
Kahua.....	8 years.....	Mother Leper

<i>Name.</i>	<i>Age.</i>	<i>Parent.</i>
Kamaka.....	4 years.....	Both Lepers
Likapeka.....	1 year.....	Father Leper
Lilia.....	13 years.....	Father Leper
Abikaila.....	9 yrs } Sisters of Mahai	Father Leper
Elikapeka.....	7 yrs } and Keoloewa.	
Keoho.....	3 years.....	Both Lepers
Hoomanawanui.....	11 years.....	Both Lepers
Kalua.....	10½ years.....	Both Lepers
Leialoha (This girl is a leper).....	9 years.....	Both Lepers
Mary.....	3 years.....	Mother Leper
Total, 12 girls.		

Of the total number it will be seen that fourteen are above the age of six years, or at or above the age when the permanent teeth begin to empty, the earliest period of life when I have seen a case of leprosy developed, and before which I do not believe it ever appears, at least it must be seldom, as I have not seen a case younger among over two thousand lepers who have been under my charge.

Two of the fourteen only are lepers, although in addition to being born of leper parents, they have lived in the houses of lepers all their lives.

In 1866 the easterly side of the point of land projecting out into the sea from the base of the cliff, on the northern side of Molokai, was duly set apart for a residence for persons afflicted with leprosy: and the disease having been by law declared contagious, all lepers were required to remove, or be removed, to this settlement.

In 1873 the westerly side of the promontory was annexed to the settlement, but there remained several kuleanas, or homesteads, which were not purchased by the Government, and the owners of these kuleanas remain on their lands to this day.

With a number, at least, of these kamaainas, or owners, it has the custom to take lepers into their families to reside, so as to share the rations of food provided by the Government for the sick; and, where this has not been the custom, they have freely commingled with their leprous neighbors, and, in two instances, have inter-married with lepers.

The total number originally of these kamaainas were thirty-eight. One of them developed leprosy before the place was annexed to the settlement, but none of the rest have become so since the annexation, a period of eleven years.

Now let us proceed to sum up the evidence.

First—The Royal College of Physicians, a body of medical men representing the highest medical intelligence of the age,

deny the contagious nature of the disease, after a study of it lasting through a period of several years.

Second—Acting on the advice of this body of medical men, the Secretary of State for the English Colonies instructs the Governors of the Colonies, "that any laws affecting the personal liberty of lepers ought to be repealed; and that, in the meantime, if they shall not be repealed, any action of the Executive Government in the enforcement of them, which is merely authorized, and not enjoined by the law, ought to cease."

The results of such action, if the disease was contagious, would seem most certainly to be a vast increase of the malady. Let us see whether this be so or not.

In the *Chronicle* of the London Missionary Society, March, 1884, I find the following, by Rev. James Kennedy, M. A.: "Lepers are found in all parts of India, not in such numbers as to be an appreciable portion of the population, but in such numbers as to be well known. They are regarded by the Hindoos as objects of divine displeasure, not on account of wickedness in the present life, but on account of wickedness committed by them in a former birth. While thus regarded they are not excluded from society, as was the case with the Jews, and is still the rule in some parts of the world. They are allowed to move about, and to ask alms of those they meet. At Benares, I have sometimes seen them sitting on a native bedstead with persons who, if they did not touch them, showed at least no dread of their immediate neighborhood." * * * "While Kumaun was under native rule lepers were buried alive, their nearest relatives heaping earth on them, but since the establishment of British rule, in 1815, this atrocious custom, as well as other customs equally inhuman, has been suppressed." P. 89.

Rev. J. H. Bruce, of Satara, India, writes: "I cannot find that there are any government laws whatever on the subject of leprosy. There are certainly no laws of segregation, and lepers are found everywhere in their own homes and villages. There are no restrictions in regard to their marriage,—there could hardly be any in this land of *infant* marriages. In the case of adults, the non-leprous party would shrink from marrying a leper. When, however, one of the parties became a leper after marriage, there would not always, and perhaps not generally, be a separation of husband and wife. * * * We have had in our house for years a child nurse, who is the widow of a leper. * * * You ask how Vishompunt could preach and visit if he were a leper? The fact of his being a leper was well known, and never in any way concealed, yet he continued his pastoral work until within a week of his death." Letter to Rev. C. M. Hyde, D.D., published in *Hawaiian Gazette* May 14th, 1884.

"I find from the censuses of the following Provinces of 1871 and 1872, comprising nearly the whole of India, viz., Bengal, Madras, Bombay, the Central Provinces, the Northwest Provinces, Oudh, Coorg and Mysore, that the total number of lepers then enumerated was 99,639, or 1 in 1,864 of the population; but, as I have already stated, about 1 in 1,500, or 120,000 would be, I believe, nearer the truth."—p. 42, "Leprosy." W. Munro, M. D., C. M. Manchester, 1879.

Third—Segregation, except in so far as it prevents hereditary transmission of the disease, has absolutely no effect towards checking it.

A. In India, under native rule up to 1815 lepers were buried alive but still the disease persisted while under English rule with no compulsory segregation we find at the most, only one in 1500 persons a leper.

B. In Norway it begins to decrease with only one in twelve and a fraction segregated, and by the time two in five are segregated, 45 per cent. of the disease has disappeared in the short space of twenty-five years.

C. In South Carolina the disease does not increase in forty years without segregation.

D. In Hawaii, where a larger percentage of cases are segregated, than Norway the disease for many years increased. Although at no time within the last fifty years have less than one half the cases of leprosy in this kingdom been segregated, and for the last two years a still larger proportion.

E. Heredity plays but little figure in the spread of the disease, because we find that after sending more than 2,800 lepers during a period of eighteen years to Kalawao Leper Settlement there are only twenty-six children alive and only two of these children are lepers.

While, however, this disease is as I believe absolutely non-contagious, that fact does not do away, as far as these Islands are concerned, with the need of strict segregation. Let loose the 903 cases who are now segregated, and remove the laws of segregation, and before a month, life here to any person of ordinary sensibility would be nearly unendurable. The rotten festering loathsome persons of a host of lepers would undoubtedly be seen on every street and highway. For these people seem utterly incapable of understanding, or feeling, why they should not exhibit themselves in all their repulsiveness anywhere and everywhere.

The disease is seen altogether more of, at large and in public, now than is pleasant, and if the law of segregation were to be abolished, I for one would very quickly seek some other locality for a residence. But carrying out the law to the letter presents

almost insuperable obstacles, which no one who has not been in a position to know from personal experience can fully comprehend. The separation of wife and husband, parents from children, and sending them away forever is a horrible responsibility while the scenes witnessed at such partings are heart-rending.

Fourth—Leprosy is an absolutely non-contagious and non-communicable disease FROM A LEPER to any other person by any possible combination of circumstances, except by heredity.

a. We find that seven incubations, namely, the two cases inoculated by Dr. Bargillo, the two cases mentioned by Dr. Powell of medical men wounded in dissecting leprous cadavers, Dr. E. Arning, and myself, wounded in the same way, and also Dr. Browne, who lost his finger as the result of inoculation, and no leprosy results. These seven cases mentioned do not, as is seen, include Kauuku the mail carrier on Molokai, who had his finger badly bitten by a leper.

b. Husbands who have leprous wives, and wives who have leprous husbands as is seen in the 103 cases of married persons at Kakaako Hospital, do not contract the disease in a larger proportion of cases than among the community at large.

c. Women conceive and bear children by leprous husbands, and in some cases, first by a leper, and the children also develop leprosy and yet the wife and mother escape, and, as found afterwards, capable of bearing healthy children by a healthy man.

d. Food cooked by lepers and eaten by non-lepers; the clothing of non-lepers washed by lepers, and the blood and pus saturated garments of lepers laundried by non-lepers, eating, sleeping, drinking with lepers for years fails to reproduce it.

Fifth—Those who are constantly exposed to the disease for years as physicians, nurses and attendants on lepers seem to invariably escape, certainly the proportion is not larger if as large as among the population of countries where leprosy is endemic. In fact I can find only one case in medical history where a physician contracted it and no nurses are mentioned as having it.

For years it has been the custom here among those advocating contagion to offer what to them seemed apparently an unanswerable argument in favor of contagion.

"Thirty or more years ago, there were only a few cases here, and now there are hundreds, it must have spread from contagion. there is no other way to account for it."

In A. D. 1856, when I first went to a mining camp in California, malarial troubles were a thing unknown, but in less than ten years "fever and ague" was as common, or more so there,

than leprosy is here now. Yet no one thought of contagion, although not unfrequently one after another would be taken down with the disease in the same place.

Very frequently a man would be taken sick with the disease, and shortly after the wife, or *vice versa*, which, according to some acute observers who write on leprosy, is a sure proof of contagion, but probably these people would not observe any sign of contagion under the same circumstances with malarial disease; but I am utterly unable to see why it is not as much a sign of contagion in one case as in the other.

As I have before stated, nineteen foreigners, exclusive of Chinese, have come under my care, having the disease, during the four year's residence in the Kingdom.

All these persons, with one exception, were adult males, with no history in any instance of hereditary taint.

How have these parties contracted the disease?

This brings up the question of Etiology.

GEO. L. FITCH, M. D.

APPENDIX I.

REPORT BY DR. EDWARD ARNING.

HONOLULU, H. I., November 14th, 1885.

To His Excellency W. M. GIBSON,

President, and Members of the Board of Health.

SIRS:—At the request of the President of the Board, I furnish you with a report as to the course of investigation, carried on by me with regard to Leprosy.

The general headings, under which the work is being conducted, may be classified thus:

- I.—Clinical.
- II.—Morbid—Anatomical.
- III.—Special Bacterial Research.
- IV.—Therapeutic.
- V.—Hygienic.

All these different classes of work have had an even amount of attention bestowed on them, which I will try to outline in the following, without of course going into details, which have found, and will find, their place in medical publications.

I.—The *clinical work* embraces: Inquiry into the general historical features of the disease, and into the history of the disease in the individual. I have here encountered great difficulties, and am afraid have wasted time and patience in trying to derive reliable information from the Hawaiians. Lack of observation of their personal health and wilful deceit are so mingled with truth in their statements, that I defy anybody to collect reliable statistics, such on which it might be possible to base proofs for hereditary or congenital transmission of Leprosy on these Islands. Of course, I do not deny that good anamneses

may be obtained in some cases, but to base theories on this kind of evidence alone must assuredly lead to fallacy.

The second part of the clinical work pertains to the symptoms of Leprosy, as we find them on these Islands, and their similarity, or dissimilarity, to the symptoms described in the accounts of observers at other times, and in other localities. The practical drift of this comparative symptomology, as I may term it, is perhaps, not quite obvious, although none the less important. All endemic and epidemic diseases are apt to modify their character and appearance with time and circumstance. General experience goes to show that milder forms follow the more malignant type, and may be welcomed as indications that the disease has reached its acme. Certainly this applies more strictly to epidemics of acute character, but, due allowance being given for time, it holds good also for the chronic infectious type of disease.

Now, there seems to me to be no doubt that a great number of cases are to be found on these islands which present, and often have presented for years, one or two symptoms of leprosy, mostly belonging to the group of leprous nerve lesions. I style these cases *abortive leprosy*, and I venture to hope that they may be hailed as signs of a decrease of virulence of the disease in general. I have bestowed particular attention on the symptoms of these initial and abortive cases, as the diagnosis of leprosy is, of course, a terribly severe one, and more liable to be disputed in these cases than in the advanced stages. Full notes have been taken of all these cases, and will be of importance in a number of years hence, when I shall try to gain new information about them, and see whether the leprous virus was only dormant in them, or actually exhausted. Of the value of these cases for therapeutic action, I shall have to say more hereafter.

A great number of lepers was examined as to the presence or absence of the *Bacillus Lepræ*. The results I summarize as follows:

1. The *Bacillus* is found plentifully in all nodules of the tubercular cases, and likewise in the diffused swellings of the skin in the tubercular cases.

2. It is found in similar quantity in the nodules and diffused infiltrations of the mucous membranes of the mouth, throat, nose, rectum and large intestine.

3. In case of softening and breaking down of these nodules, the bacillus is mixed with the discharge in great quantities. The presence of sores in the mouth, throat, and nose causes large numbers of bacilli to be contained in the saliva and the mucous discharge from the nose. In leprous diarrhœa which closely simulates dysentery, but which I have been able to trace to lep-

rous, not dysenteric ulcerations of the bowels, I have been able to detect the bacillus in the fæces.

4. In the so-called anæsthetic cases, the bacillus is not found in the anæsthetic patches, nor in the chronic sores of necrotic parts of skin, tissue, and bone; but as nerve excisions have proved to me, in the nerves supplying these mutilated parts with vitality.

5. The bacillus cannot be found in the bright red patches, so frequently ushering in the first formidable attack of the disease and mostly occurring on the face. These patches are always located in the distribution of some larger nerve and are seats of local vasomotoric congestion, based on leprous disease of this nerve.

6. The bacillus cannot be found in the urine of lepers, which is accredited by the Chinese to be the infection-carrier "par excellence."

7. The bacillus as such cannot be found in the blood, not even during the febrile attacks marking the progress of the disease. As it has of late been asserted by different observers that the blood contains the germ, particular care has been bestowed on this point. Their statement must be due to the fact that in obtaining a drop of blood for examination, the bacilli have got into the blood by not carefully selecting a healthy spot of the skin in pricking for blood, but going through diseased tissue and getting some of the bacilli contained in this tissue mixed with the blood.

For all that, the germ may be contained in the blood, more especially during the febrile attacks, possibly in some hitherto unknown, but suspected form of spore-condition, a stage of the life of a bacillus. These suspected spores may not be visible either on account of their minuteness or which is more likely on account of our inability to make them visible by the staining methods we use in searching for bacteria.

As this is a most important point for the whole question of the spread of the germ, I have applied myself most assiduously to its investigation by devising new staining methods and employing the highest magnifying powers at our command, also by culture experiments with blood taken from lepers during their febrile attacks, with the idea of making the spores which I consider it likely to contain, grow into fully developed bacilli, and become visible as such.

At present I must confine myself to the statement that the blood of lepers, if taken with all due precautions, does not contain the bacillus.

8. It has been noted before by Danielssen and Boeck, the Norwegian observers, that leprous ulcerations of the nose occur

in anæsthetic cases, which otherwise present no ulcerations. I have met with this peculiar condition in two cases. One that of a Portuguese who had brought the disease with him from the Azores, and the other that of a young Hawaiian girl. These cases being otherwise not very advanced, and decidedly not repulsive looking, were discharged from the Branch Hospital. But I must consider these cases a great deal more dangerous than their general appearance would lead to believe. I was surprised to find in both cases the discharge from the nasal sores full of the bacillus.

Next to this microscopical work in relation to the clinical aspect of leprosy, my attention was directed to the peculiar features of *leprous anæsthesia and paralysis*. They have been examined under the heads of distribution, intensity, and mode of progress, and as to their spinal or peripheral origin. For these particulars we have to rely mainly on the modern teachings of electrodiagnosis. Let it suffice to say here, that I consider all these troubles due to leprous disease of peripheral nerves, and that I believe the distinctions found in this respect between leprosy and the great number of other diseases of the nerves, spinal chord and brain, will enable us to pronounce with more confidence on the nature of what it is here customary to call suspicious cases.

The different appearances of *muscular wasting and contraction* have been studied in comparison to similar symptoms of other neurotic diseases. The advanced, or I may say, completed stage of this muscular derangement is not so very far different from similar troubles due to other nervous lesions, such as rheumatic, diphtheritic, traumatic, etc., whereas the beginning presents more salient features, which will with due regard to accompanying symptoms enable us to specify the particular disease as leprous or not.

But this muscular crippling being largely due to mechanical causes, is decidedly not as characteristic as the *bone disease* of leprous origin. The mode of attack, the privileged seats of caries and necrosis, and the resulting crippling, are decidedly one of the most peculiar features of leprosy, and most strikingly different from bone disease, due to osteomyelitis, syphilis and tuberculosis. As such, they claim a particular share of our attention, more than they have hitherto found.

A large number of photographs and plaster casts have been taken of cases, selected at Kakaako and the Molokai Settlement, to substantiate these experiences, and to serve as illustrations for future publications.

A certain amount of attention and study has, furthermore, been accorded to *diseases of more external nature*, presenting any

resemblance to leprous lesions, and occurring both independently and in company with leprosy. As such, I mention *pigmentary and parasitic skin diseases*. A very troublesome affliction of this nature, unknown to the Hawaiians, has been introduced by the Gilbert Islanders, among whom it is quite common. I have seen a pure Hawaiian, who is married to a Gilbert Island woman, suffering with it. He had been subject to it for years, and was looked upon by some as a suspicious case of leprosy, but I have since been able to cure him entirely with simple applications of chrysophanic acid. The true scabies, or itch, due to the insect "*Sarcoptes Hominis*," is exceedingly prevalent at Molokai, and will be hard to eradicate there under existing conditions, just as we are not able to eradicate it in large cities. I have successfully stamped out a small epidemic of it at Kakaako, and great watchfulness will be further needed. Only quite recently a hideous looking case of tubercular leprosy, in a 7-year old boy, was brought to the Branch Hospital. A great part of his hideousness was due to inveterate itch, and this trouble caused him a great deal more pain and discomfiture than his leprosy. It was, of course, easily cured, and had to be done so at once on account of its eminent contagiousness.

In the foregoing I have attempted to outline the clinical part of my work. In case the Board desires it, I will condense the results into the form of a schedule, which may serve as a guide for examination of doubtful cases.

II.—*Morbid—Anatomical Work*. Here I can confine myself to closer limits. I have been able to make 17 post-mortems of lepers, which have given me much valuable opportunity to study the anatomy of the disease, and have enabled me to make some important discoveries regarding the diffusion of leprosy through the internal organs. For this reason I deeply deplore that lack of support by the Board has put a stop to this most intrinsic part of my work since last Spring.

In all advanced tubercular cases, I was struck with the extreme frequency of grave changes in the larger viscera, more especially the lungs, liver, spleen, and bowels. These organs presented an aspect quite new to me, and closer examination of their tissues has enabled me to prove that we have been mistaken in attributing deaths of lepers to inter-current pneumonia, tubercular phthisis and dysentery, which were simulated by the clinical symptoms. The ulcerations of the bowels and the breaking down of lung-tissue are due to leprous infiltrations, and we shall have to modify our opinions of leprosy, being mainly a disease of the cutis and peripheral nerves and introduce terms such as *phthisis leprosa* and *enteritis leprosa*, etc.

As far as the brain or spinal chord were examined, I found

them unaffected, but they will yet have to find a very close and searching microscopical scrutiny. This applies generally to all the material collected from the post-mortems and preserved in different ways.

III.—The *bacterial research*, i. e., the question of etiology of leprosy, is another most essential part of my investigation, and at the same time the most subtle and delicate. No one who has not tried himself at this particular kind of modern research is able to judge of its many disappointments, its dependency from apparently insignificant particulars, and the difficulties which crowd upon you when you are working outside of the accustomed laboratory with its always handy intelligent help and never-failing supply of requisites.

The line of experiments embraces :

1. Search for the germ of leprosy in the air, water, and food.
2. Attempts to breed it outside of the living organism on artificial soils, employing the greatest variety of composition of soil and different grades of constant temperature.

Of soils I have used :

1. Koch's meat-peptone-gelatines of varying strengths.
2. Gelatines made of seaweed and meat.
3. Gelatines made of seaweed and fish.
4. Bouillons of meat and fish.
5. Sterilized and solidified serum of blood taken direct from the carotid artery of bullocks and sheep.
6. Vegetables, solid and in decoctions.
7. Poi.

After being sterilized, i. e., freed by high temperature, (steam and dry heat,) from any germs they may accidentally contain, these soils are implanted, in sterilized containers with the leprosy germ and kept for weeks together at constant temperature in the incubator, and carefully watched day by day.

Until now, the results of this work are altogether negative. Under all the varied conditions, I have not once succeeded in obtaining an independent and pure growth of the *bacillus lepræ*.

Parallel with these culture experiments, or artificial soils, a large number of experiments were conducted to grow the germ in living tissue. For this purpose I have procured and inoculated a variety of animals at ages ranging from a few days old to grown up beasts, rabbits, guinea-pigs, rats, hogs, pigeons, and a monkey. They were inoculated in and under the skin, in the cavity of the abdomen, under the conjunctiva of the eye, in the anterior chamber of the eye, and in the ulnar nerve, mostly with small pieces of leprosy tubercle excised under antiseptic precautions.

I have been able to follow up, microscopically, the presence

of the *bacillus lepræ* at the spot of inoculation for months after the introduction, but have not in a single instance been able to observe any general symptom of leprosy.

The negative results of all this work are not valueless and discouraging. On the contrary they act as a stimulus for further research. I am not in the habit of drawing hasty conclusions, especially from negative evidence, but as from well proven analogy with kindred diseases we know that the *bacillus lepræ* is the etiological factor of the malady, and as we find it impossible to discover, or grow this bacillus outside of the human body, but find it in immense numbers and rapidly increasing in the human body, we are naturally driven to the following conclusions:

1.—The *bacillus lepræ* is a parasite limited to the human race.

2.—It must be transmitted either directly from individual to individual, or—

3.—Run through a stage of intermediate life (spore condition), which we are at present unable to detect, for reasons given above (on page 39 of this report), but which may be present in the soil, water or food, but can only get into them from the diseased tissues of a leper.

4.—Accepting either theory, the direct or indirect transmission, we must look upon every individual leper, whether in the incipient or advanced stage of the disease, as a dangerous focus of the malady, he multiplying and nursing the germ in his tissues.

5.—As every seed requires its peculiar conditions of soil, atmosphere, etc., to allow it to strike, and, when struck, to grow up to be itself a seed-bearing plant, so does the leprosy germ require a certain disposition of the human soil to strike and thrive. What this peculiar disposition may be, we are at present unable to define. It is evidently a disposition which may co-exist with apparent good health, as many examples of strong robust men, developing leprosy, show us. This disposition may possibly be transmitted by heredity. I desire not to be misunderstood on this particular point. I do not believe that leprosy itself is in any case congenital; but I do believe that a certain weakness to resist its attacks may be transmitted.

I have hinted at similar ideas in the motives accompanying my application to His Majesty's Privy Council, to be allowed to perform some inoculation—*experiments on the condemned convict Keanu*. The application I made resulted in the sentence of death, passed on the murderer, being commuted to penal servitude for life. With the prisoner's written permission, I commenced operations on the last day of September, 1884, after hav-

ing previously made a most searching inquiry as to any leprous taint in his family, and a close examination of his own body. This examination satisfied me that, as far as I am able to judge, no trace of the disease could be found in him at the time. A further step was to insure that the prisoner would not be employed at work outside of the prison walls.

As stated above, I inoculated Keanu on the 30th day of September, 1884, and, for the four weeks following, I saw him daily, and after that once a week for several months, a microscopic examination of the inoculation spot being made every time. After that period the convict has been examined by me regularly, once or twice a month. The microscope revealed the presence of the *bacillus lepræ* in large numbers until the middle of March, 1885. They have since gradually diminished in number, but a recent excision of a small part of the scar shows them present even yet, i. e., nearly 14 months after the inoculation.

At the same time there is nothing in the general appearance of the convict which would denote any development of leprosy. Pains in the joints of the inoculated arm, from which Keanu suffered in January and February last, have since disappeared.

To the foregoing I wish to add the following remarks:

1.—I do not consider my experiment with Keanu concluded, or mature for scientific publication.

2.—Even if future observation should show us no trace of leprosy developing, we would not be able to infer more from the experiment than that in this case inoculation proved ineffectual.

3.—I have given this account of the experiment to Your Excellency, and the members of the Board, to allow you to judge of the spirit in which it is being conducted.

4.—Moreover, I have been induced to do so by recent perfectly unauthorized publications of Dr. Fitch, in a California Medical Journal, as a protest against the thoroughly unprofessional conduct with which this author, who could only gain knowledge of my doings in an underhand manner, has brought my name and work forward in support of his own unproven assertions.

I take the same opportunity to protest against the narrow arguments used by the same author, as far as this subject of inoculation goes. He cites my name, and an ordinary post mortem blood poisoning which I acquired at the autopsy of a leper as a proof of the non-possibility of inoculation of leprosy. It would be a very bad thing, indeed, if all the cases of common, local, or general septic poisoning, at a post-mortem should result, in our acquiring the disease the patient was subject to.

Vague statements of this nature do not deserve, and would

not find an answer from me in a scientific publication, but as they are put forward with the intention of captivating the mind of the general public, and are as bold and positive assertions more apt to do so than the often restricted and guarded utterances of calm independent observation, I have given them this brief consideration in my report.

Closely allied to the inoculation question is the subject of vaccination. You are doubtlessly aware of the very prevalent opinion among medical men, that the unusually rapid spread of the disease may possibly be attributed to the great amount of indiscriminate vaccination which has been carried on in these islands. There have, if my information is correct, unquestionably new centres of leprosy developed after vaccination was practiced and several old inhabitants have told me, how they themselves used no precautions whatever in vaccinating during a small-pox scare, but brought the lymph directly from one arm to another, without even wiping either points or lancet.

To bring some light on this moot point, I vaccinated a number of lepers. The vaccination only took in three cases, one tubercular and two anæsthetic. Both the lymph and crust of the tubercular case contained the *bacillus lepræ*; in the anæsthetic cases, I could not detect it. As the vaccinations are now conducted by medical men and with bovine virus, it may seem to be perfectly superfluous to dwell any further on this point, it apparently presenting only historical interest. But recent experience causes me to advise the Board not only to supply its medical officers with animal vaccine and points, but also to issue strict regulations as to the manner how this virus is to be used. If the lancet is dipped into the virus, then into the arm, then again into the virus and the next arm, or if points used for one vaccination are re-coated for further use, as physicians of the other islands have, at my special inquiry, owned to do, then the use of bovine virus gives us no safe-guard whatever against the propagation of constitutional disease by vaccination. The main point is the thorough disinfection of the lancet after making one vaccination, and before dipping it into the lymph for the next arm. This is easily obtained by heating the point of the lancet in a spirit flame to a dull red heat, and it forms a main part of the instructions issued to the Government physicians in Germany.

Another point which has been raised is the possibility of the leprous virus being conveyed by mosquitos. I am at present occupied with investigating this subject. The endemic elephantiasis of the tropics, a disease which is happily unknown here, has lately been traced to propagation by mosquitos, and by these solely.

IV.—The next of my headings is that relating to *therapeutics*. As this is one of the practical sides of the question, and one in which the general public naturally takes the greatest interest, as it considers it more within its scope than the rather distant etiological and pathological studies relating to leprosy, I beg to be permitted to begin with some general remarks on this subject.

All our therapeutic action may be classed either as *specific* or *symptomatic*. Looking upon disease as a weed, which grows in the fertile soil of the body, we may say that with the former, we aim to strike at the root of the weed, whilst with the latter we only lop its branches and keep its growth in check.

There are very few diseases where we can rely entirely on specific treatment, the most notable being syphilis, malaria and acute rheumatic fever. For these three diseases we possess in mercury and iodine, quinine and salicylic acid respectively, real specific medicines; and if by their aid we have been able to restore a patient suffering from either of these troubles, we may say he has been cured by these medicines. On the other hand we have a vast number of diseases where we have to rely on symptomatic treatment, i. e., mainly alleviate pain, ward off external danger and keep up the power of the body, so that it may rally to healthy reaction and cast off the disease by its own efforts. This applies to all our acute zymotic diseases, the eruptive fevers, small-pox, scarlatina, measles, etc., to the various typhus fevers, to cholera, dysentery, etc., and very nearly to all chronic diseases, foremost to consumption, the scourge of our age, and as yet to leprosy.

We have no specific for leprosy, nor has any man of any other country or nationality. Scientific medical information reaches too far now-a-days to permit of any agent of this kind being known by an individual and kept as a secret. Anything put forward in that way without being published through the regular channels must be regarded as quackery and nothing else.

Anybody who is read on the subject of leprosy, in fact, any remoter medical literature will be struck with the amount of attention bestowed on the therapeutic portion in those writings. The tendency of our age is to simplify therapeutic action as much as possible, and not experiment empirically, but bring therapeutics within the rational limits of physiology, etiology and pathology. There is scarcely a drug in the pharmacopea, at least scarcely a class of drugs, that has not been most systematically tried in the treatment of leprosy. Over and over again men of sanguine temperament have found what they called a specific cure, but in every instance calm and unbiased judgment has afterwards pronounced a verdict of uselessness.

How is it that these facts are not accepted, and a different line of therapeutic attack inaugurated?

Let us pay more attention to careful *symptomatic* treatment of leprosy. Even the advanced cases we can help and benefit a great deal more than is generally believed. The great number of incipient cases will furnish us opportunities enough to try new lines of specific treatment.

Let the scourge this nation is subject to be turned into as much good as possible, and let arrangements be made (for it is not feasible, under the present circumstances,) to let at least a limited number of advanced patients be benefitted by modern medical and surgical progress. On the other side, let the incipient cases be divided into classes, and treated systematically on different principles, but under one general management and observation.

I beg to refer you to my first report, written for the Session of the Legislature of 1884. I have already then dwelt on this point, and, I am happy to say, not without results. My suggestions of a home for suspected and incipient cases, and of regular medical school examinations, have been carried out, and order and cleanliness prevails, where there was an acknowledged bad state of affairs before 1884. But if you ask me whether enough has been done to be able to say to the world that all is being done for the lepers that can be expected, and in a model way for other nations, looking with fervent interest to Hawaii's fight with leprosy, I must say no. The therapeutic side, the treatment is neglected.

I have been told that my views are too advanced. I answer, that I am proud of it, and that I consider nothing can be too advanced in the treatment of a question which has been grappled with for centuries in the old style of isolation and feeding.

What I have repeatedly applied for is a small hospital-ward within the Kakaako enclosure, with say no more than 6 or 10 beds, but managed separately from the general settlement. This hospital should have a nurse and a servant attached to it, and to it exclusively; have arrangements for hot and cold and permanent baths, steam baths, gas baths, etc., and ought to be fitted with all the necessities of clinical research, and medical, surgical and electrical treatment. The patients would be selected from the general flock, according to the wishes of the physician put in charge of this trial station. Then the journals, which would have to be strictly kept of every case, would be able to contain all that accurate information, without which modern clinical work is considered incomplete, and which it is impossible to gain under existing circumstances. Then electrical treatment, which is undoubtedly of great, even surprising benefit,

could be carried on ; and surgical operations, such as removal of necrosed bone, stretching of nerves, cutting and stretching of contracted muscles and sinews, and operations on the eye, and other important organs, be attempted with more view to success than is possible at present, where no arrangements of any kind are made for all this at the Branch Hospital.

The therapeutic results I have achieved, under less favorable circumstances than those enumerated would offer, urge me to renew this request.

After these general remarks I will, in a cursory way, state the methods of treatment I have adopted for different classes of lepers, native and foreign, some treated at Kakaako, some as outside patients. Some 60 cases I find in my private books, which I look upon as either fully developed and progressive, or abortive, or incipient, or suspicious cases of leprosy. A number of them have since been received at the Branch Hospital, a number of foreigners have left the country, others I have lost sight of, and some few I consider so far benefited by continuous treatment, that I might doubt their being afflicted if I did not find the record of their previous state in my books.

Since about a year I have found in the external use of salicylic and pyrogallie acid agents of undoubted value for symptomatic local treatment. With them it is possible to destroy leprosy tubercles and soften diffused leprosy infiltrations, sometimes even to restore a portion of the feeling lost over these infiltrated patches. Especially the conspicuous red patches, which usher in the commencement of tubercular leprosy, and often stand for years without fading, subside readily under local treatment with an ointment or paste containing 10 per cent. of salicylic acid. Isolated tubercles and serpiginous leprosy papules have been entirely removed with a strong solution of pyrogallie acid in traumaticine, or with a 10 per cent. pyrogallie acid ointment. For the diffused leprosy infiltrations, I use a 10 per cent. solution of salicylic acid in oleic acid. Internally, I have used either nothing, so as to be sure that the disappearance of the symptoms was due to the local applications alone, or salicylic acid in large continued doses. I have certainly seen fresh febrile eruptions occurring during this treatment, but in several cases a decided improvement, even when used without any local treatment.

Special reasons induced me to try a very active *sulphur* treatment in one case. Sulphur was administered internally as hyposulphate of soda, and the patient was subjected to a sulphurous acid gas bath every day for one hour. The more pronounced tubercles of the face were at the same time treated with compression and deep local injections of absolute alcohol, which caused prompt breaking down and cicatrization of the

tubercles. This method I have since discarded for the more efficient and less painful pyrogallic acid treatment. I am sorry to say that this patient, whom I had under this treatment for a full year, and who was one of those put under my special charge by the Board, was, like two other patients of this particular lot, removed from the Branch Hospital without my knowledge. Such steps are naturally not inclined to promote scientific work. In deciding the advisability of their removal I might at least have been asked, and my reasons for retaining them weighed with those which prompted the action of the Board.

The much-abused *mercurial* treatment has been used both as a general and local application. For the general treatment I have relied chiefly on hypodermic injections of corrosive sublimate, a centigramme of the drug being injected daily. In one case of a well-educated native man, who has been under my treatment for nearly two years, I have given two courses of these injections—one of a hundred, and the next of sixty—without any trouble, although the injections are a little painful. His enlarged ears were treated with excisions and deep scarifications, and an anæsthetic spot on the back and the anæsthetic big toe of his left foot were successfully treated with electricity. The patient now feels that he has regained his lost strength and mental activity, looks hale and hearty, and would pass very close scrutiny without being considered in any way suspicious. For all that I do not for a moment pretend to have effected a lasting cure—that remains for time to prove; nor do I feel inclined to let the patient go without further treatment, though he is apparently in vigorous health. He is at regular periods taking small doses of mercurials, and should go on with this for a number of years.

In another case of a rapidly progressing mixed form the quick course of the disease has changed to a slow progress after eighty hypodermic injections of corrosive sublimate. I am sorry to say that this is one of the cases taken out of my observation at the Branch Hospital. The anæsthetic and contracted hand was steadily improving when I was treating it electrically at my office. This had to be discontinued when the patient was removed to the Branch Hospital, no appliances for this purpose being provided for there. Since her dismissal she is under no treatment whatever, but, as I hear, in the family-way, and losing the improvement she had gained in her hand.

In other outside cases I have used *creosote* and *carbolic acid* treatment, the former in pills of which Dr. Hillebrand speaks very highly, the latter as hypodermic. Only in one case did I see marked effects. In this, local injections of a five per cent. car-

bolic acid solution were used, and restored colour and feeling in a white anæsthetic spot on the cheek.

Iodide of potassium failed entirely at my hands.

Electrical treatment was used in quite a number of anæsthetic cases, and when persevered in long enough proved very efficient. One patient especially, a white man, who had several anæsthetic patches on the arms has recovered entirely. He has at the same time been taking from $1\frac{1}{2}$ to 3 grammes of salicylate of soda daily for a whole year. Another patient, a native woman, who had, besides other symptoms, a nearly complete anæsthesia of the left arm and contracted useless hand for over ten years, is now enabled to stretch her fingers and use them for needle work, the feeling being completely restored in two of the fingers. The treatment in her case has extended over very nearly 18 months, and very high doses of *arsenious acid*, up to 9 centigrammes daily, have been taken internally, the patient standing this drug extremely well, whilst from some other experiences I have learned to be extremely cautious with this drug in the treatment of leprosy.

The very distressing symptoms on part of the nose, mouth and throat, which are in the general run of the treatment of leprosy all helped to a gargle and nothing more, deserve especial attention for several reasons:

1. There is nothing so apt to run down the appetite, and with it the general health of the patients, as the continual swallowing of putrid matter from festering sores of these parts.

2. The discharge from these sores containing the bacillus in great numbers, as stated above, there is sufficient ground to believe that like in similar cases of tuberculosis, the above specified leprosy ulcerations of the bowels are caused by self-infection from swallowing the pus secreted from these sores.

3. The heavy breathing and hoarseness, the disgusting smell and the ever abundant secretion makes these patients doubly loathsome and dangerous.

My experience teaches me that these ulcerations are especially amenable to local treatment. The daily application of antiseptics, caustics, and astringents, as the case may require, the fixing of ointment tampons, the use of medicated sprays and steam inhalations, all this can be used with much success, and ought to be used in a hospital for lepers.

Similar arguments relate to the treatment of the disease of the eye so common in leprosy. I firmly believe that *early* operation for leprosy nodules on the conjunctiva, and for leprosy iritis will rescue a large number of the unfortunates from irretrievable blindness, and the paralytic drooping of the lower eyelid which so commonly leads to loss of vision in leprosy, may

just as well be benefited by plastic operation as it is in facial paralysis from other causes. But to effect all this, and a great deal more which I will not detail, there is required good will on all sides. On part of the physician it must be brought, and on part of the patients it will have to be courted and enforced by more vigorous support of the medical work by the Hospital Board, working in concord, and with the advice of the hospital physician.

I now draw to the close of this report with a few remarks as to

V.—*Hygienic* measures. I will skip the common-place, but nevertheless all-important subject of general sanitation and improving the social habits of the people, but try to give some more definite points.

Traveling round the islands to gain information on these subjects, I found in some parts, especially so in parts of Kauai and Maui, more lepers at large, and in unconstrained intercourse with the healthy population than ought to be under the present laws. Now I do not think it possible for the Government to take charge of all lepers, but as long as the powerful law of segregation is in force let it be brought to bear on cases which are really complained of as public nuisances. I have intentionally visited the remotest gulches and corners where but few white men penetrate, and have found more bad cases of leprosy than I expected. Perhaps it may be just as well to leave these poor wretches in their homes, where they are just as much or more out of the way than at Kakaako or Kalaupapa; but there is an important point to consider. Pent up with these bad cases in their squalid huts and houses are apparently healthy children. These ought to be removed, for they are the future and hope of the nation. And not alone the girls, but also the boys should be removed, especially so as old and new statistics point to a prevalence of leprosy among the male sex.

But one thing must be avoided if we accept the theory of disposition in children of leprous parents. We must keep these out of harm's way even more carefully than other children whose families are free of the taint.

I know that it is acknowledged by Your Excellency and the members of the Board that the present Kapiolani Home is not in its proper position, and that only the most pressing circumstances have necessitated the selection of the present site.

From my point of view I must stand by my original proposal to have the Home out of sight and reach of the Leper Asylum. If we want to keep the possibly-disposed systems of the chil-

dren free from the disease, the first step should be to remove them as far as possible from it, and not to tabu them within the walls of a lazaretto.

The next point touches the vaccination question, with which I have dealt at length under the heading of experimental work. I would further urge that the *medical examinations of school children*, which has led to the elimination of quite a number of cases, should be kept up regularly and carefully. As an instance of their necessity, I may quote a case which has quite recently come under my observation. A little girl (native) belonging to one of our large schools passed my close examination a year and a half ago as healthy, but now presents initial symptoms of leprosy. We must not rely on general healthy appearance in these examinations, and on a furtive glance at hands and arms. I have found unmistakable marks of leprosy on the back of a child that held a recent health certificate. Moreover, we shall have to extend our examinations even to very young children in spite of Dr. Fitch's assertion that leprosy does not make its appearance before the period of second dentition. I have seen a child with clear signs of leprosy at $3\frac{1}{2}$ years of age, and know of another boy who was a marked case at 4 years old.

As this country has to rely on immigration mainly coming from countries where leprosy is endemic, i.e., China, the Azores, and Japan, considerable care ought to be exercised in guarding against new cases of the disease being imported from there. I know of two unquestionable cases of leprosy having come here from the Azores—the one was the Portuguese man mentioned above, the other a young Portuguese girl who, immediately after her arrival, half a year before I was asked to examine her, obtained a position as nurse in one of our best families.

Altogether it is deplorable, though perhaps inevitable, that these islands with their terrible abundance of leprosy should be repopulated by the very nationalities, who seem to have not yet overcome a disposition to the disease as much as other races.

There are two more points I wish to bring again before you, one of more local, the other of general and scientific importance. Both have been subjects of previous memoranda to the President of the Board.

The first applies to the necessity of furnishing a wash-house at the Kakaako Hospital to obviate the certainly unpermissible practice of some of the lepers sending their soiled clothing out to be washed.

The other relates to the *disposal of the dead bodies of lepers*. To make this report complete, I shall here insert the text of my previous communication, sent to the President of the Board, in June last:

To His Excellency W. M. GIBSON,
President of the Board of Health,

SIR :—I beg to submit to Your Excellency's consideration the following facts, which I have recently discovered with regard to the power of resistance of the germs of leprosy to putrefaction. I communicate this result of my work immediately to you, because it seems to me to have a direct practical bearing towards public sanitation.

A series of experiments in this line were commenced in October, 1884. Leprous tissue and matter was set aside under conditions of temperature and moisture most conducive to slow and thorough putrefaction, whilst the growth of the larger fungi was at the same time carefully excluded. From time to time a microscopical examination was made and the characteristic *bacillus lepræ* was not only found to hold its own against the germs of dissolution and putrefaction of albuminous matter, but met with so abundantly and laden with spores that the idea suggested itself there might be actual increase. An examination made a few days ago of the remains of this leprous tissue, set aside fully eight months ago, shows it to consist nearly entirely of swarms of the *bacillus lepræ*, closely packed. Every vestige of the cellular and fibrous structure of the tissue has disappeared, even the *bacteria* of putrefaction have crumbled up into a mass of detritus, but the *bacillus lepræ* is there with all its peculiar microchemical reactions.

The discovery prompted me to examine dead bodies of lepers under the ordinary and natural influence of decomposition. Not being able to acquire the desired corpse here, I went to Molokai, and succeeded in procuring parts of the body of a tubercular case, which had been buried for nearly three months, and was in the most active state of putrefaction. After what I had learned from my experiments, I was not surprised to find the leprous germ present in large numbers.

I candidly admit that I am not yet able to give a decisive answer to the question, whether these germs are alive and capable of reproducing the disease. This final question will not be solved till we have been successful in artificially cultivating and inoculating the germ, a result which none of us, who are engaged in this question, have as yet achieved. However, I feel personally confident, from the microscopical evidence alone, that they have not lost their power of germinating under the above named conditions. At any rate, it seems to me desirable to effectually bar even the possibility of a spread of the disease, through the slow decomposition of the dead bodies of lepers, in the grave yards surrounding the town. Cremation would certainly be the surest safe-

guard, but, as that can hardly be achieved, I suggest the compulsory filling up of the coffins containing the corpses of lepers with quicklime. To secure this end, I deem it necessary to stop the practice of letting friends and relations take away the dying lepers to their homes, as has recently been done in several cases.

* * * * *

Thus far goes my previous communication on this subject.

Let me close these observations and suggestions relative to the hygienic side of the question with the following general appeal. Increasing familiarity with a signal danger lessens our fear of it, but not the danger. This applies most pointedly to our relations to leprosy. We live amongst it, and there are many of us, not only Hawaiians, but also foreigners, who have grown so accustomed to it, that they not only do not heed it themselves, but by word and deed try to dispel the fears of others. This is all very well, and has its good side when it becomes necessary to dissipate a scare. But as long as this is absent it will be a good thing to sound a warning note from time to time, so that carelessness on part of the population may not be the outcome of assurances of safety. Examples like those of Father Damien, who has now himself become a leper, and as such a veritable martyr to his cause, and of other worthy and pure members of the community whose names I am not authorized to mention, should teach us a lesson, and cause us all to work harmoniously and united for the one good end, to confine the dreaded leprosy to its closest limits, and to help and support the poor afflicted ones with the best of our will and skill.

I have the honor to remain,

Yours most respectfully,

(Signed)

ED. ARNING, M.D.

APPENDIX O.

*Copy of Correspondence between the BOARD OF HEALTH and DR.
EDWARD ARNING.*

OFFICE OF THE BOARD OF HEALTH,
Honolulu, Nov. 30th, 1885.

ED. ARNING, M. D.

SIR:—By instruction of His Excellency Mr. Gibson, the President of the Board of Health, I have the honor to acknowledge receipt of your report as to the course of investigation carried on by you with regard to leprosy, dated Nov. 14th, 1885, addressed to him and to the members of the Board of Health, and am furthermore instructed to make the following remarks for your consideration and attention.

In the month of February of the present year, His Majesty's Government, through the Foreign Office, addressed His Majesty's accredited Representatives abroad, a series of questions somewhat similar to those propounded by the Royal College of Physicians in England, in 1862, to medical representatives of Foreign Powers in whose borders leprosy exists, or is suspected of existing. To these questions His Majesty's Government has received interesting and valuable replies in many instances. It is proposed to print these reports in conjunction with your report and other material of value in the study of leprosy. His Majesty's Government deeply appreciating the good will shown by other nations in collecting and forwarding, at no little cost of time, labor and money; the information required, is naturally anxious to reciprocate to the best of its ability by furnishing to such Foreign Powers all the information the Board of Health can obtain in regard to leprosy as it exists on the Hawaiian Islands.

It is reasonably considered that after the two years you have spent on these Islands in the service of the Board of Health with liberal emolument, combined with your high

recommendations to the Board as an honorable scientist and close and faithful student, and the facilities and opportunities it has placed at your disposal for experiment and observation, you have been enabled to acquire knowledge and information in regard to leprosy, of great value and importance to the Health Authorities of the Kingdom, and to all interested in the study of the disease. The impression is therefore felt that it is within your power to present a report of value and benefit to those engaged in battling with the disease abroad; creditable to this State and honorable to your talent and your position as the Government's Special Medical Representative.

I am not instructed to make any comments upon the report of Nov. 14th, farther than this, that in the opinion of His Excellency the President of the Board, it is incomplete and inconclusive, and not such a one as might be anticipated after two years of special labor, with considerable outlay of public funds.

I am instructed to speak of the report as incomplete by reason of references in it to notes and data not presented to this Honorable Board with the report, but mentioned as being retained or intended for "future publications;" and, farthermore, to request that you furnish to the Board by way of schedule or appendix, the schedule referred on page 12 of the report to "serve as a guide for examination of doubtful cases." It is also deemed proper that the "full notes," referred to on page 4 should be presented to the Board. On page 10 reference is made to photographs and casts of cases selected at Kakaako and Molokai, the President expects that duplicates of these be placed in possession of the Board; allowance being made for any extra expenditure on your part; and, also, the notes of autopsies made by you on Hospital cases should be given for future medical reference.

On page 32 occurs this, "I will, in a cursory way, state the methods of treatment I have adopted for different classes of lepers, native and foreign, some treated at Kakaako and some as outside patients." The President is of opinion that the notes of such cases or some of them would materially aid to the scientific value of your report abroad, and should be furnished.

On pages 40 and 41 reference is made to your "traveling round the Islands," in search of information, and also to the large numbers of lepers on Kauai and Maui, "in unconstrained intercourse with the healthy population."

The President will be pleased to receive more definite information on these matters, for the consideration of the Board.

A more extended notice of the large body of leper patients whom you have visited on Molokai could not fail to be of interest.

Having outlined the views of His Excellency the President for your consideration,

I have the honor to be, Sir, your most obedient servant,

FRED. H. HAYSELDEN,
Secretary Board of Health.

HONOLULU, Dec. 15th, 1885.

To His Excellency W. M. GIBSON,

President of the Board of Health.

DEAR SIR,—I am in receipt of the letter of the Secretary of the Board of Health, dated Nov. 30th, and regret that my report on the progress of my investigation of Leprosy is unsatisfactory to Your Excellency.

I will beg to state, that after due consideration, and after having submitted my report to some of my medical friends, viz., Doctors Trousseau, McKibbin and Brodie, I cannot modify it or make a more extensive one. My friends and myself are of opinion that, as information for a lay Board of Health, it is as complete and conclusive as necessary.

It is far from my desire to have, for the present, a full scientific report published, as my investigations are not nearly completed, and will probably take many more years to allow me to come to positive conclusions.

Footing on the preliminary correspondence between Your Excellency and Dr. Hillebrand, and our own conversation after my arrival, I could not look upon the moderate salary allowed me by the Board otherwise than as an assistance and encouragement to purely scientific work ; but never for a moment understood that either my work or notes, or specimens, etc., could be claimed by the Board for its own purposes. The above were mostly obtained at my private expense, and for my private use ; and, therefore, I must decline to furnish duplicates, or put at the disposal of the Board, my private

notes of cases and post-mortems, these being collected for future scientific information and publication.

It is unnecessary to say, that in these latter due credit will be given to the Hawaiian Government for all assistance rendered to me.

I have, however, keenly felt that this assistance was not such as I was led to expect from the above-mentioned correspondence, especially as far as moral support was concerned.

I further beg to state that I did not visit the Lepers on the other islands with the intention of gathering information for the Board of their whereabouts, but for my own private knowledge, to be able to judge of the causes of the continued spread of leprosy, in spite of segregation. The finding and segregating of these cases is a duty devolving on the public and local Government physicians.

I have the honour to remain, yours respectfully,

ED. ARNING, M. D.

OFFICE OF THE BOARD OF HEALTH,
Honolulu, Dec. 22d, 1885.

ED. ARNING, M. D., Honolulu.

SIR:—By the instruction of His Excellency the President of the Board of Health, I have the honor to inform you, that by a recent resolution of the Board, a special committee was appointed to make such reduction in the Medical Staff of the Government as they deemed advisable; and, acting under this authority, it has been decided to discontinue your services on the Staff.

Your statement to the President, in your letter of the 15th instant, that it will take you many years to come to positive conclusions in your medical investigations; that you never understood that your work, or notes, or specimens could be claimed by the Board, and as you decline to furnish duplicates, or place at the disposal of the Board any notes of cases or of autopsies:—all these being collected, as you state, for future scientific information and publications, satisfies the Board, after the expenditures made on your account, of the propriety of their action in this matter.

Your appointment as a resident physician, in the employment of the Board, will cease on the 31st instant; and be-

tween now and this date you will vacate the offices situated in the Kakaako Hospital enclosure, now used by you, leaving therein such articles as have been supplied to you by the Board.

I have the honour to remain, Sir, your most obed't serv't,

FRED. H. HAYSELDEN,
Secretary of the Board of Health.

HONOLULU, Dec. 28th, 1885.

FRED. H. HAYSELDEN, Esqr.

Secretary of the Board of Health.

SIR:—I have the honour to acknowledge receipt of your letter dated December 22d, 1885, informing me of the decision of a special committee of the Board of Health to withdraw my appointment as a resident physician in the employment of the Board by the end of this month.

The premises I have used for my work at Kakaako will be vacated by the 31st inst. I shall leave therein such articles as have been supplied to me by the Board.

I shall draw my salary of \$150 for December, on the 31st inst.

I furthermore claim the payment of my expenses connected with my return to Germany, which His Majesty's Government agreed to defray, and which I figure at five hundred dollars.

I have the honour to remain, Sir,
your most obed't servant,

ED. ARNING, M. D.

APPENDIX U.

*Copy of Correspondence between HON. C. R. BISHOP, and others,
and the President of the Board of Health, in regard to DR. ED-
WARD ARNING.*

HONOLULU, January 28th, 1886.

To His Excellency W. M. GIBSON,

President of the Board of Health.

SIR:—A number of the physicians of Honolulu, and many other gentlemen resident here, consider it of very great importance that the investigation by Dr. Arning, applying to leprosy, should be continued in a thorough manner for a further period of two years; and believing that the Board of Health will be not only willing, but quite desirous, of co-operating in a work which may be of inestimable advantage to this country, and of value to the cause of science and humanity the world over, by granting such facilities and moral support as are and may be within its power, the undersigned, a committee appointed by the subscribers to a fund in aid of such investigation, are authorized to assure Your Excellency that if such support and facilities as are necessary are granted by your Honorable Board for the period above stated, the salary of Dr. Arning will be paid from said fund.

Herewith we enclose copy of a communication, signed by a number of the prominent physicians of this city, expressing their views upon the matter in question.

Hoping for an early and favorable reply to the foregoing proposition, we have the honor to be,

Your obedient servants,

CHAS. R. BISHOP,
F. A. SCHAEFER,
J. B. ATHERTON.

[COPY.]

HONOLULU, January 25, 1886.

To Messrs. C. R. BISHOP, F. A. SCHAEFER, and J. B. ATHERTON,
members of the Committee of the Leprosy Investigation
Fund.

GENTLEMEN:—The undersigned, members of the medical profession residing in Honolulu, have learned that it has been decided by the Board of Health to discontinue the appointment of Dr. Arning as Physician in charge of Leper Patients in the Branch Hospital at Kakaako, and that the reason alleged for such removal is the necessity for retrenchment in the expenditure of the Hawaiian Treasury.

We consider that it is advisable, for the benefit of natives as well as foreigners, that the study of leprosy and the causes associating for its spreading should be continued.

Dr. Arning having come to this country for the express purpose of investigating in a scientific manner the causes of the spreading of this horrible disease, and being so well qualified for that work by study and experience, and so well equipped with instruments, we are of opinion that his removal, and the consequent interruption of the important work in which he has been hitherto engaged, will be little short of a public calamity, and will produce most unfavorable criticism in all other civilized countries.

We, therefore, hope that it may yet be possible to induce the Board of Health to reconsider its action, at least so far as to allow him all necessary aid and facilities for thorough and continuous experiments and investigations, and that you may be able to guarantee the payment of Dr. Arning's salary for two years without calling upon the Board for any help in that matter. It is a duty which we owe to our profession and to the public to make this statement, and to record our conviction that a grave error would be committed by any interruption of the investigations which Dr. Arning has conducted during the past two years.

We remain, Gentlemen, respectfully yours,

(Signed)

G. TROUSSEAU,
JOHN BRODIE,
JNO. S. MCGREW,
HENRI G. MCGREW,
N. B. EMERSON,
MRS. DR. EMERSON,
ROBERT MCKIBBIN,
CHARLES T. RODGERS,
G. H. MARTIN,
S. G. TUCKER.

OFFICE OF THE BOARD OF HEALTH,
HONOLULU, January 30th, 1886.

To Messrs. C. R. BISHOP, F. A. SCHAEFER and J. B. ATHERTON.

GENTLEMEN:—His Excellency, the President of the Board of Health, has instructed me to acknowledge the receipt of your letter (and its enclosures) of January 28th, 1886, in which you state that: "A number of the physicians of Honolulu, and many other gentlemen, resident here, consider it of very great importance that the investigation by Dr. Arning, applying to leprosy, should be continued in a thorough manner for a further period of two years: and, believing that the Board of Health will be not only willing, but quite desirous of co-operating in a work which may be of inestimable advantage to this country, and of value to the cause of science and humanity the world over, by granting such facilities and moral support, as are and may be within its power, the undersigned, a committee appointed by the subscribers to a fund in aid of such investigation, are authorized to assure Your Excellency that if such support and facilities as are necessary are granted by your Honorable Board for the period above stated, the salary of Dr. Arning will be paid from said fund."

In reply, I beg to say, on behalf of the President of the Board of Health, that the past history and conduct of His Excellency, in connection with the disease of leprosy on these islands, have proved his sincerity, energy and anxiety in the matter of dealing with it, both as a legislator and as a Minister. It is, perhaps, unnecessary to remind you, gentlemen, of His Excellency's successful efforts to induce the legislature of 1878 to grant the appropriation of \$10,000 for the medical scientific investigation of leprosy, or that it was at His Excellency's own suggestion, and by his correspondence with Dr. Hillebrand, and his own personal influence and exertion, that Dr. Edward Arning, himself, came to this country to pursue his studies and experiments, as a medical scientist, under the patronage of the Hawaiian Government.

It is, perhaps, equally unnecessary to refer, upon this occasion, to other practical measures for the benefit of the leprosy sick of the Kingdom, which have been initiated and carried out by His Excellency and his colleagues, except to enable you, gentlemen, to bear in mind that His Excellency's endeavors, in the interest of the lepers, and the public health generally, are unwearying and unabated.

In regard to the decision of the Board of Health "to discontinue the appointment of Dr. Arning," I would beg to recall to your memories the following extract, from a portion of a letter from Dr. W. Hillebrand, to His Excellency, dated Dec. 16, 1882, and published in the report of the Board of Health to the Legislature of 1884: "That in consideration of the important results for the welfare of the Hawaiian people, which are likely to derive

from the intended investigation on the contagium of leprosy, the Hawaiian Government declares itself ready to assist Dr. Arning, either by a direct grant or otherwise. The sum in question is very moderate, simply large enough to cover the expense of living on the Islands for the space of nine months. I imagine that you will be justified to set aside a small portion of the money appropriated by the Legislature for sanitary purposes. If not, you can appoint him physician to the Leper Settlement, where Dr. Arning will be obliged to spend the greater part of the time."

Dr. Arning arrived in Honolulu the 8th of November, 1883, and has received from the Hawaiian Government a salary, as a Government Physician, of \$150 a month since that time, together with sundry outlays in connection with his experiments, making an aggregate of over four thousand three hundred dollars (\$4,300). The period contemplated for his proposed investigations, and the cost thereof, have as you, gentlemen, will readily observe, been considerably extended, in the hope of securing tangible results in the cause of medical science.

His Excellency, consequently, after the lapse of so much greater time than was originally anticipated, and the very liberal expenditure of public monies, desired to obtain from Dr. Arning such a report of the progress of his labors as would give to the incoming Legislature some strong evidences of justification for the expenditure, be an indication of future requirements and appropriations, and an aid to the consideration of the ultimate value of such investigations to the Hawaiian people, and the world at large, and the outlining of the course to be pursued in connection with them, by co-operation, development or otherwise.

Upon the receipt of Dr. Arning's report by His Excellency in November last, a correspondence (of which printed copies are enclosed) ensued, which terminated in the Board of Health discontinuing Dr. Arning's services. Retrenchment was not given as a reason; as this correspondence plainly shows; and, as a matter of fact, the scientific investigation of leprosy will be continued by the Board. Dr. Arning, as you, gentlemen, will read, was requested by His Excellency to supplement his report with further information, a most reasonable request, and one which it might readily be anticipated, a willing student or investigator, receiving the financial and moral support of the Government, would accede to. The terms of the declination appear. Upon His Excellency receiving Dr. Arning's assurance that it was not his intention to contribute the information required, and that, practically, the information was intentionally withheld, from motives other than those of humanity and science, and the en-

abling the Hawaiian Government to intelligently consider the value to the country of Dr. Arning's elaborate experiments and labors, it was deemed proper to cancel an apparently unlimited engagement—at any rate, until the meeting of the Legislature.

His Excellency's desire has been to lay the foundation in this city of a repository of medical knowledge for the use of all medical men, and others interested in leprosy, and to collect there for reference, specimens, photographs, notes of cases and experiments, books of reference, and so forth, such as would be of infinite value to medical observers and practitioners. As a preliminary to this His Excellency has obtained from Foreign Governments the information referred to in the correspondence with Dr. Arning, and it was not unreasonable to expect that a distinguished scientific student, "commissioned by one of the highest scientific bodies," from no motives of gain, but prompted by the simple enthusiasm of science and philanthropy, would cheerfully avail himself of an opportunity to aid his fellow men in so philanthropical a cause.

His Excellency desires me to express his cordial commendation of the humane and patriotic spirit which has induced you, gentlemen, and others, to provide for Dr. Arning's salary for two years in order to enable him to continue his investigations, and I am instructed to say that His Excellency will be glad to provide all such facilities and moral support as may be accorded within the law, by the Board of Health, to promote scientific or other investigations, or experiments, by any foreign physicians coming here accredited by a scientific body, or by their respective Governments.

As Dr. Arning has already had over two years' experience in the investigation of leprosy in this country, His Excellency will be glad to afford him farther opportunities to study the disease, under what he deems most favorable conditions, with all the surroundings that could be desired by a humane and earnest scientific investigator—by enabling him to pursue his investigations at the Leper Settlement on Molokai. At that place there are upwards of 600 lepers of all ages, sex, and condition, and in varying stages of the disease; and, furthermore, Dr. Arning will find there several of his former patients whom, he says in his report, were removed from his charge and treatment.

His Excellency will recommend to the Board that Dr. Arning be provided with a house at the Settlement for a private residence, with out-buildings for small hospitals and laboratory, and such patients as he may desire to have placed under his special charge under conditions not in conflict with the general medical management of the physician of the Settlement. His

Excellency will also recommend that Dr. Arning be provided with rations, or an allowance in lieu thereof; with one or two riding horses, and with one or more animals, such as sheep, hogs, etc., that can be found at the Settlement, and may be required for inoculation or other experiments. He will be permitted a reasonable liberty of action, and all facilities and moral support within the power of the Board of Health to accord to him.

I have the honor to be, Gentlemen,
Your most obedient servant,

FRED. H. HAYSELDEN,
Secretary Board of Health.

HONOLULU, February 8th, 1886.

His Excellency W. M. GIBSON,
President of the Board of Health.

SIR:—We have the honor to acknowledge the receipt of the letter of the Secretary of the Board of Health, in reply to our letter of the 28th ult., to Your Excellency.

Without attempting to reply to all points in the Secretary's letter, we will give our attention to that part most pertinent to the object we are charged with—that is, the paragraph which reads as follows: "As Dr. Arning has already had over two years experience in the investigation of leprosy in this country, His Excellency will be glad to afford him further opportunities to study the disease under what he deems most favorable conditions, with all the surroundings that could be desired, by a humane and earnest scientific investigator, by enabling him to pursue his investigation at the Leper Settlement on Molokai. At that place there are upwards of 600 lepers of all ages, sex, and condition, and in varying stages of the disease; and furthermore, Dr. Arning will find there several of his former patients whom he says in his report were removed from his charge and treatment."

As Dr. Arning has heretofore been permitted to pursue his investigations at Kakaako (the Branch Hospital for Lepers), as well as at the Leper Settlement on Molokai, and as those acquainted with the two localities, know the former affords many conveniences and advantages (to say nothing about the greater personal risk and privation at the Settlement), which could not be provided at the latter without large additional expense to the physician, as well as to the Treasury, and in some important

particulars could not be provided at all, we cannot regard the letter of the Secretary, as it now reads, otherwise than as withholding suitable facilities for further investigation by Dr. Arning. You, no doubt, anticipate his declining to be confined to the Molokai Settlement, and he will have no reason to fear that his reputation as a "humane and earnest scientific investigator," will be compromised by doing so. There is no doubt as to the liberal disposition of the Legislature of this country in the past, or for the future in all matters relating to the public health, and that body is not likely to regard the sum already expended, or that will be required in the future for Dr. Arning's services if he is permitted to continue them, as excessive or mis-spent.

Dr. Arning is, we believe, the first scientific investigator, who has come from abroad, to devote himself to the study of leprosy, since the government began the care for the lepers, and if he is compelled to stop in the midst of his work for lack of support and facilities within the control of the Board of Health, it is unlikely that any other foreign physician "accredited by a scientific body, or by his government," will offer his services for a like purpose.

Without further preliminary, we now beg to state what Dr. Arning considers requisite, in order to pursue his investigations in a manner most likely to lead to valuable results, which is substantially as follows: Free access to the Branch Hospital at Kakaako, and to the Leper Settlement on Molokai, for himself and his assistant, and to all of the inmates at both places; a separate hospital ward of eight beds at Kakaako, for four male and four female cases, to be selected by himself; the ward to be fitted and appointed as stated in his late report to the Board of Health; a room attached to the ward with a northerly light, and with water, etc., for special work; a convenient place for such animals as are necessary for experiments; and also the firm and hearty support of the Board, in certain work, which may not be agreeable to the mind of the patients; but which forms a most essential part of the investigation, i. e., regulation of diet, enforcement of special ward rules, surgical operations, post-mortems, etc.; and finally, it should be understood that no patient will be removed from his care without his knowledge, and without reason given therefor.

If, in the foregoing, anything is asked for which cannot be granted, we shall feel much obliged if Your Excellency will state what item it is, so that we may see whether or not it can be omitted or arranged for in any other way; but if the Honorable Board of Health will not grant the facilities within its control, or declines to provide such facilities at Kakaako, then the purpose of those who are willing to assist with their means

in promoting this important investigation in the interest of the public, will be defeated, and Dr. Arning will not be detained any longer, a result which we should greatly regret.

We remain, Sir, your obedient servants,

CHAS. R. BISHOP,
F. A. SCHAEFER,
J. B. ATHERTON,
Committee.

OFFICE OF THE BOARD OF HEALTH,
HONOLULU, February 10th, 1886.

To Hon. CHARLES R. BISHOP, F. A. SCHAEFER, Esq., and J. B. ATHERTON, Esq. :

GENTLEMEN :—I have the honor to acknowledge receipt of your letter of the 8th inst., and have to say, in reply, that I am somewhat surprised at its contents, especially at the tone in which the declination of the offer made by me in behalf of the Board of Health to you, on Dr. Arning's behalf, is conveyed.

Apparently it would be useless to reiterate or enlarge upon the advantages, which I believe the Leper Settlement on Molokai (the chief centre of the disease, where there are over 600 cases of confirmed leprosy), possesses over the Branch Hospital at Kaka-ako (with barely one hundred cases of a much milder type), for such a line of investigation as is proposed by you for Dr. Arning.

It suggests itself in this connection, to my mind, that the assistance and co-operation of such an able and experienced physician, as the Resident Physician at the Settlement, should be worthy of some consideration, as it might be of practical benefit to Dr. Arning, who certainly could endure, equally with Dr. Mouritz, in the cause of science, "the greater personal risk and privation at the Settlement."

The uncalled for assumption conveyed by the expression, "you no doubt anticipate his declining to be confined to the Molokai Settlement," compels me to believe that Dr. Arning has met with unwise advisers, whose course of action throughout has been dictated, not entirely for the public welfare, nor by philanthropic interest in the progress of Dr. Arning's labors on behalf of the lepers ; and I regret that, even in the cause of the sick, unworthy prejudices are permitted to intrude where charity, as well as science, should be supreme.

The *ultimatum*, it can scarcely be called a *request*, of "what

Dr. Arning considers requisite," I deem it necessary to say, must be most emphatically declined. In my opinion the proposal is one of such an important character in its present bearings, and future connections with established departments of the Government, that it should be reserved for Legislative discussion and action, in connection with other kindred plans and proposals relative to leprosy.

To grant the *demands* of those who claim to speak on behalf of Dr. Arning, would be, practically, to create an irresponsible extra-medical department for leprosy, capable, perhaps, in the hands of Dr. Arning, individually, of doing much good; but, at the same time, possessing the elements of discord, and the possibility of creating considerable confusion and mischief. Furthermore, it would be establishing a precedent, for creating indirectly a new and largely salaried office, the responsibility of which I do not feel inclined to advise the Board of Health to accept.

I beg to say, gentlemen, that I do not impute to you such a motive, in your anxiety on Dr. Arning's behalf, but I feel it proper to intimate that such a result would be a possible sequence to your present efforts,—if successful.

I regret that the offer made to Dr. Arning, on behalf of the Board of Health, in the letter of the Secretary of the Board, of the 28th ult., has been declined.

I have the honor to be, Gentlemen,

Your most obedient servant,

WALTER M. GIBSON,

President Board of Health.

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APPENDIX H.

OFFICE OF THE BOARD OF HEALTH.

HONOLULU, January 30, 1886.

G. TROUSSEAU, M. D., Honolulu.

SIR:—I am instructed by His Excellency the President of the Board of Health to inform you that the Board purposes publishing, in connection with and in response to a very valuable series of reports sent to His Majesty's Government, by the authorities of Foreign Governments, a series of statements or reports in regard to Leprosy in the Hawaiian Archipelago, in the humane hope that an exchange of information may be of some benefit to medical science for the better understanding of this dread disease.

I am also requested to state that any information you may feel disposed to furnish as to Leprosy on these Islands, (whether from your own experience in private practice or from knowledge otherwise acquired), or any opinions or suggestions as to the treatment socially or otherwise of Lepers, for publication and transmission to other Governments will be accepted with the consideration due to your distinguished professional position.

I am further instructed to request that, in the event of your being willing to contribute your views on this important subject, your manuscript should be forwarded to the President not later than March 1st.

I have the honor to be, Sir, your most obedient servant,

FRED. H. HAYSELDEN,

Secretary.

Similar letters to the above were forwarded to the following gentlemen: R. McKibbin, M. D., J. Brodie, M. D., N. B. Emerson, M. D.

Reply from Dr. Robert McKibbin.

HONOLULU, 1st Feb., 1886.

F. H. HAYSELDEN, Esq.,

Secretary of the Board of Health.

SIR:—In reply to your circular of 30th ult., I beg to state that in consideration of the manner in which the very able report of Dr. Arning, on leprosy, was received by the Board of Health, the way in which he has been treated, and his summary dismissal by the Board, in the midst of his (in my opinion) most valuable and important investigations of leprosy and its treatment, which cannot be as well, or as successfully, continued by any other person on these Islands; for the above, if for no other reasons, I feel reluctantly constrained from furnishing the Board with any report of my observations of Leprosy, or its treatment, or of offering any opinion on the subject whatever.

I have the honor to be, Sir,

Your most obedient servant,

ROBERT McKIBBIN.

Reply from Dr. N. B. Emerson.

HONOLULU, February 8th, 1886.

To His Excellency W. M. GIBSON,

President of the Board of Health.

SIR:—I am in receipt of your favor of January 30th, inviting me to furnish any information I may feel disposed to as to Leprosy on these Islands.

In reply, I beg to state that I fully appreciate the immense importance of making a thorough study of Leprosy, as we find it in this Archipelago, and I also appreciate the difficulty and intricacy of such work.

In order to command in the highest degree the respect and confidence of scientific medical men, it is necessary that observations on the pathology, etiology and therapeutics of this truly formidable disease, should be made on a large scale, and should be based on actual practice and experiment, brought down to date, among such masses of patients as are collected at the Branch Hospital at Kakaako.

As I am not in the possession of any such facilities as these, and, therefore, cannot come up to my own standard of excellence in this matter, it hardly seems wise for me to undertake to make any communication on the subject.

I have the honor to be, Sir, very respectfully yours,

N. B. EMERSON.

Reply from Dr. John. Brodie.

HONOLULU, February 6th, 1886.

To His Excellency WALTER M. GIBSON,
President of the Board of Health.

SIR:—In reply to yours of the 30th ult., I am sorry to have to state that having made no special study of Leprosy, excepting in regard to its diagnostic features, I am unable to contribute anything of value to the literature of that disease. These opinions without notes of cases and treatment upon which to base them, would be worse than useless.

I have the honor to be, Sir, your obedient servant,
JOHN BRODIE.

APPENDIX K.

REPORT OF ARTHUR MOURITZ,

Resident Physician and Medical Superintendent at the Leper Settlement, Molokai.

MOLOKAI, February, 1886.

To His Excellency W. M. GIBSON,

President of the Board of Health.

SIR:—I have the honor to submit my Report on the Leper Settlement, and at the same time treating in detail the suggestions contained in the letter from the Secretary of the Board, dated December 21, 1885.

Whilst submitting the statements contained in my Report, I think it almost superfluous to draw your Excellency's attention to the difficulty attached to the prosecution of inquiries on the subject of Leprosy in this Kingdom, as knowledge of a clear and concise nature, from the very obtruseness of the subject, can scarcely as yet be gained.

The materials for drawing up true and reliable information do not exist in this country, or if they do exist at all, it is only within a very recent period; books, papers or any printed or written records are for the most part wanting. Viva voce interrogation of old residents (foreigners) give rise to such diversities of opinion, that only doubt and increased perplexity ensue in the mind of the interrogator; such means of seeking the truth, however, must not be put aside. Again, on the other hand, an obstacle of no small moment arises in the "total unreliability of the information received from the natives themselves," from want of a thorough comprehension and appreciation of the great importance and aim required in answering questions pertaining to scientific enquiry. To sum up briefly, no satisfactory information, bearing on the subject of Leprosy in all its phases, can as yet be given.

I wish at the outset to state that my personal views, and the information set forth generally, will, as far as is possible, deal with the subject of Leprosy as met with in the Sandwich Islands; also, that my statements and deductions apply to my own personal field of observation chiefly, viz., the Leper Settle

ment on Molokai, my connection with this establishment dating from November 1, 1884.

As to the Origin of Leprosy in these Islands.—On this point I must confess I have not found any information sufficiently reliable to be put on record as authentic.

When I first entered this country, a few years ago, I asked about the origin of Leprosy, interrogating physicians and many laymen on their own views of the matter, or if they had met with hearsay evidence. No two replies were alike, but most agreed that Leprosy did not prevail extensively in these Islands before the year 1860, some twenty-six years ago. If cases of the disease did exist previous to this date, they did not obtrude themselves on public view to a sufficient extent so as to be noticeable, or to call for any general comment.

According to the information set forth by Dr. Hillebrand, Leprosy was introduced into Honolulu by the Chinese in the year 1848, and the Doctor saw the first Hawaiian Leper five years later; ten years afterwards the disease had spread considerably in the immediate neighborhood of presumably the first propagated Hawaiian case.

These facts, as related by Dr. Hillebrand, are very valuable, and in so far as Honolulu is concerned may be quite sufficient to account for the appearance and spread of Leprosy there. But to conclude that from this focus the disease spread over the entire group, such a conclusion is open to many objections. Undoubtedly there must have been other forces at work to cause the disease to increase to its present proportions on all the larger islands. It is, however, quite possible that the Chinese carried Leprosy primarily to other places on the group besides Honolulu.

Mr. Brickwood, a resident on these Islands in the year 1840, recognized the disease of a certain native in Honolulu to be Leprosy. This gentleman had previous knowledge of the disease in another country where it prevails endemically, viz., Egypt. I have been able to meet with still earlier evidences of its existence. Whilst reading the published diary of one of the very early missionaries of the American Board of Missions, two passages in his writings are worthy of further consideration. One of these speaks quite possibly of Leprosy, the other mentions the fact of its existence. The writer of the published diary I allude to was the Reverend Charles Samuel Stewart, who landed at Honolulu on April 27, 1823. He has kept almost a daily record of events which occurred to him during his residence in these Islands. In Volume I, page 163, will be found the following entry in his diary a few weeks after his arrival, May 22, 1823:

"Nor to mention the frequent and hideous mark of a scourge, which more clearly than any other proclaims the curse of a God of purity, and which while it annually consigns hundreds of this people to the tomb, converts thousands while living into walking sephulceres, the inhabitants generally are subject to many disorders of the skin. The majority are more or less disfigured by eruptions and sores, and many are unsightly as *Lepers*. The number of either sex, or of any age, who are free from blemishes of this kind is very small, so much so, that a smooth and unbroken skin is far more uncommon here, than the reverse is at home."

I certainly think that from this extract alone, many of these skin diseases, this writer alludes, to may have been manifestations of Leprosy and not Syphilis.

From the vivid portrayal of the great prevalences of visible diseases, the Hawaiian race at that time must have been grievously afflicted with all the ills mankind is liable to, certainly the major portion.

Were this the only extract from Mr. Stewart's diary on the subject of the disease, the Hawaiians were afflicted with, it might be justifiable to conclude that Syphilis was at the root of all the maladies the aborigines suffered from, but on page 212 Volume I, Leprosy is distinctly mentioned.

"July 4, 1823.—Indeed we seldom walk out without meeting many whose appearance of misery and disease is appalling, and some so remediless and disgusting, that we are compelled to close our eyes against a sight that fills us with horror. Cases of Ophthalmic Scrofula and *Elephantiasis* are very common."

I think after reading these passages many will agree with the conclusion I have come to. That amongst the unsightly, hideous, remediless and disgusting cases, many were Lepers, perhaps very many more than the writer supposed.

That the author means *Elephantiasis Græcorum*, or true Leprosy, and not *Elephantiasis Arabum*, is quite apparent. The appearance of the latter has no parallel with that of the former. And again *Elephantiasis Arabum* has never been known to have existed here. It remains then that the *Elephantiasis* of the above passage is the true Leprosy, such as prevails at the present time amongst the islands of the group. * * *

The Segregation of the Lepers.—About the year 1864 the large increase in the number of Lepers commenced to agitate the mind of the community, and steps were taken to adopt measures to check the spread of the disease, and the Law of Segregation for Leprosy was enacted in January, 1865.

In November of that year a small hospital was established near Honolulu at Kalihi, capable of accommodating about fifty

inmates, where a somewhat systematic inspection could be made of those who were brought to the hospital as Lepers, many persons being arrested in error, the disease not being Leprosy. These of course were liberated; the mild cases, and those of moderate degrees of severity to whom some good might be expected to accrue from improved conditions of living and medical treatment, were kept in the hospital; the confirmed and hopeless cases were sent to the permanent settlement, the site of which had been selected at Kalawao, on the Island of Molokai.

Dr. Hoffmann, of Honolulu, who was connected with the Kalihi Hospital at its establishment, has kindly given me the following information: "Generally fifty cases were under treatment from time to time in the hospital, the cases being equally divided. The two usually described varieties of the disease existed, viz., the Tubercular and the Anæsthetic; the former as is usual, preponderated. During my charge between 600 and 700 Lepers were transferred to Kalawao. I found no permanent benefit from treatment; better food and cleanliness, medicine, suited to improve the general health of the Leper, ameliorated the disease temporarily."

The hospital at Kalihi was abolished in the year 1875. During its existence about forty Lepers died there, and some ten deserted, but all the others who had passed through its portals, (the diagnosis of the disease being certain) finally reached Molokai; many, however, being conveyed direct to the settlement from the other islands.

The Leper Settlement.—The Leper settlement on Molokai is situated about the centre of the north or windward coast of the island, and in so far as the question of isolation from the adjacent portion of the land is concerned, a better site could not have been chosen. Nature herself having disconnected the upland from the plain below; the intervention of a steep and lofty mountain chain completely encompassing the plain on the landward side. The plain is in the form of a tongue of land, three sides being washed by the ocean, the fourth or continuation of the base of the tongue ending in perpendicular cliffs, washed by the sea, affording no egress or ingress, except by boat or canoe. The extreme length of this tongue of land, which runs almost due north and south, is about two and three-quarters miles, at the base where the said portion of land joins the mountains its width is three miles, at the centre of the tongue two and one-half miles wide, and seaward toward the top one mile wide, comprising approximately eight square miles of surface, richly covered with grass, but totally devoid of trees. On the eastern side close to the base of the mountains lies the village of Kalawao. At a similar situation on the western

shore, but further removed from the mountains lies the village of Kalaupapa, the chief port of the settlement, where merchandise, food, etc., are generally landed, three and one-quarter miles seaward of Kalaupapa lies the small village of Ilioki. Makanalua is placed close in to the mountains, midway between Kalaupapa and Kalawao; immediately opposite and to the seaward of this village rise the walls of the extinct crater of Kahukoo, which attains an elevation of 493 feet above sea level. This crater, when active, in conjunction with the soil washed from the adjacent gorges and side of the mountains, has formed the lands which comprise the Leper Settlement.

From the eastward edge of Kahukoo the land trends towards the sea, and ends in rugged, steep cliffs 70 feet high, making access to the sea a difficult and almost impossible undertaking. The north shore resembles the eastern, but the cliffs are less elevated—about 15 to 20 feet, and honeycombed by the force of the ocean. The north-west shore is level with the sea, and affords easy access to it, which, as the western shore is continued landward, becomes more difficult, even off Kalaupapa—the port. There is a considerable break in the rim of the crater of Kahukoo towards the north-east, where the lava has burst out; the elevated edges of this channel trend from north-east to north, forming a barrier which breaks the force of the north-east trade wind, and thereby affords some shelter to Kalaupapa. The village of Kalawao, as I have mentioned before, is situated on the eastern side of the leper reservation, and is exposed to the full force of the north-east trade wind—the usually prevailing wind—which assumes the proportion of a gale for days and weeks together, and it is chiefly on this account that the land is devoid of trees, together with the wind being strongly impregnated with saline matter.

During many days in the winter months the climate of Kalawao is most ungenial, being bleak, cold, and rainy; these conditions being of comparatively no inconvenience to the healthy, but to the leper a serious drawback. Then, again, the high cliffs, towering 3,000 feet above the village, effectually shut out the direct rays of the sun from the early hours of the afternoon.

Kalaupapa faces the west, is sheltered by Kahukoo from the prevailing wind, is further removed from the base of the mountains, and, therefore, has the direct benefit accruing from the sun's rays. The abundance of the grass affords evidences of a considerable rainfall, and this is the experience of the residents. In 205 days, dating from early in November, 1884, to the end of May, 1885 (the rainy season here occurring in the months of November, December, January, and February), rain fell on 101

days, sometimes continuously for days together; notably the end of April and beginning of May. I was informed, however, that 1885 was an unusually wet year.

The slope of the surface, and the geological formation (lava rock covered with a foot or two of soil) conduce towards good drainage, so that the heavy rainfall does not affect the health of the residents as it would do provided the surface water had opportunity of storage, which would then occasion subsoil dampness with its concomitant evils, excess of rheumatism, catarrhal complaints, and phthisis, ague, etc.

The mountain range, which shuts off the Leper Settlement, is continued east and west the whole length of the island of Molo-kai, gradually reaching a less elevation towards the westward, but towards the east rising until finally the mountains acquire an elevation of from 3,000 to 4,000 feet. The seaward side of this range of mountains, as viewed from Kalawao, is bold and rugged, and, after a rain storm, when numerous cascades fall from the mountain sides, the grandeur of the scenery is much enhanced; deep gorges, shut in on three sides by towering ramparts of rock, alone accessible by sea, further beautifies the natural scenery.

The appended table shows the average daily temperature in the shade, taken at 12 P. M. for eleven months:

	Centigrade Scale.
1884, November	23.4
„ December	22.2
1885, January	20
„ February	19.5
„ March	21.5
„ April	20.8
„ May	21.3
„ June	—
„ July	26
„ August	26
„ September	25.3
„ October	24.3

The water supply of Kalawao is obtained by partially damming a mountain stream, and from this storage it is conducted in pipes and distributed at intervals through the village. The quantity of water is mainly dependent, if not altogether, on the rainfall, which I have stated already is abundant, drought being a rare occurrence.

Kalaupapa has several springs situated on the beach; the quantity of water they supply is sufficient for domestic wants, but it is not over-abundant. Its quality is not good, being

largely impregnated with chlorides, and if other sources of potable supply could be conveniently obtained it would be highly desirable to dispense with its use for drinking purposes.

The dwellings provided for the lepers by the Board of Health are built of wood, whitewashed in and out, and are fairly comfortable, being a great advance on the accommodation provided in the early years of segregation.

The average accommodation provided for each leper is a cubic space of about 500 feet; at the present time, as the Settlement is not very full, each leper has nearly 1,000 feet of cubic space in his or her dwelling. Wooden houses not being airtight, 1,000 feet of cubic space is ample for mild cases of leprosy; but all bad cases should be accommodated on the basis of infectious diseases, and these should be provided with not less than 2,000 feet of cubic space, with 144 square feet of floor for each individual case.

The question of ventilation also requires careful consideration. The system at Kalawao has apparently never had attention given to it, and the result is that either the leper is chilled to the marrow, or he is poisoned by his own exhalations. Many of the lepers are encouraged by the Board to build better houses for themselves, and some are erected quite pretentiously, neat and clean in and out, approaching quite a degree of comfort.

The dwellings of the lepers are kept fairly clean by the inmates (except within the hospital enclosure); surrounded by a stone wall, enclosing an acre or so, also adds to the appearance of the cottages. Within this enclosure sweet potatoes, bananas, sugar-cane, and onions are generally cultivated, the edibles thus obtained adding materially to the ration of food allowed by the Board.

The interior of the Hawaiian house, generally, is devoid of furniture, the floor-mat or mats forming bed, bedstead and chairs; a few calabashes for food complete the equipment of Hawaiian domestic life. So it is carried on at the Settlement.

At Kalawao is situated the Hospital, or Home, where the worst cases are supposed to be accommodated. The site of this establishment is on the hill-side, about half a mile from the sea, and comprises an area of two acres, surrounded by a picket fence. Five wooden buildings, about 40 x 15, and six smaller erections, comprise the accommodation, the usual offices for preparing and storing food being in close proximity. Food, washing, and lodging are provided for the inmates, medical treatment if desired, and some attempt at nursing; but its main claim on the Hawaiian, appears to me, that he is saved the trouble of preparing his own food, washing his clothes, and procuring fuel.

Of course there are no cases of cure, and those who enter its portals remain till death releases them. Generally the Hawaiian is prejudiced against hospital restraint and treatment, not only here, but all over the islands. Many of the worst cases prefer to remain outside; the very cases the hospital was intended for do not avail themselves of the benefits we, as foreigners, think belong to such institutions. Whenever I have suggested to any sufferer outside, whom I thought would be benefited by a residence in the hospital, the desirability of having him removed there, with scarcely an exception the answer has been, "I prefer to remain, and die where I am." From these remarks, it is scarcely necessary to add that I have not thought it advisable to suggest to the Board that a post-mortem room, operating theatre, etc., and other such requisites for ordinary every-day hospital routine, should be added to the present buildings. For, had I any of these facilities, I could make but little use of them, as prejudice against innovation, and foreign medical ideas prevails largely.

With a few remarks on segregation, I will conclude this section of my report.

Very few lepers surrender themselves voluntarily—to do so is not the rule, but the exception; on the other hand, resistance is rarely offered to the execution of the law, the Hawaiians being a peaceful people; in this alone, when the execution of sanitary law is enforced, showing a lustrous example to many ancient nations, presumably more enlightened, who even now assail the execution of the simplest needful sanitary measures, the detention of the individual not being in the question. That lepers are frequently secreted by their friends is true, and quite natural that such should be the case, as no dread of the disease is manifested amongst the Hawaiians. The healthy live in the same house, eat out of the same utensils, sleep together in the same bed as the leper; all these conditions of life bringing them closely in contact with the disease, and by this means leprosy is, in my opinion, only too certainly and too frequently spread.

The law of segregation is actively enforced, as follows: On notice or complaint being given to the sheriff of the district, in which a leper resides, he (the sheriff) notifies the sufferer to appear before a physician (always a foreigner), or brings the leper to some public office (say court-house), then notifies the nearest foreign physician to attend and examine the case, whether of leprosy or not. If the diagnosis is certain, then by the easiest method and most convenient route or conveyance the leper is removed from his home, either direct to Molokai,

but more generally to the receiving-house at Kakaako, for further medical examination before being segregated finally.

That all lepers should be segregated I quite agree; that all lepers could be segregated is quite a different matter, and almost impossible, in fact. Severe cases generally become public nuisances; and are dealt with first, though even if left at large, they have the advantage of acting as danger signals to the foreigner, and to the populace generally, in nearly all countries but Hawaii. The inhabitants of the islands (the indigenous ones I mean) have always shown an utter disregard and ignorant contempt for leprosy, which slowly, but silently, seizes its victims; in fact, according to our foreign ideas of the manner disease is spread, the Hawaiian makes every effort to saturate his system with the poison of leprosy; that many only too well succeed, and thereby pay the penalty with their lives, will be shortly indicated in my tables, showing the arrivals and mortality at the Leper Settlement. In my opinion the great defect of the law of segregation of lepers lies in the fact that it carries no moral weight, and fails to get at the root of the evil; and until such time as the Hawaiian mind is impressed with the necessity of social ostracism being practised towards all lepers, not till then will the true advantages of public segregation in chosen sites be made manifest. Did social ostracism exist at the present day amongst the Hawaiians, as regards the leper, probably the non-contagious view of the disease might receive considerable support.

Lastly, whether segregation as carried out for the past twenty years, has had any beneficial effect on staying the progress of leprosy I cannot offer an opinion, my residence in the country being too brief.

In the following tables I have eliminated all kokuas, male and female, who had been placed on the list not as lepers, but drawing leper rations; these people entered into the lists of arrivals and deaths.

The rule of the Settlement, placing all children born in it on the leper list, swells the death list and the arrivals. When their death took place under twelve months, I have invariably struck them out of my mortality figures, as it was most probable they had not then become lepers. It happens, therefore, that there are a greater number of names on the list of lepers than I take account of, for the reasons above stated.

TABLE I.

Showing the number of Lepers received Annually. Their Sex. The number on the Books January 1st. The Mortality. Number discharged from the Settlement, (frequently as non-Lepers, frequently returned to Kakaako or Kalihi.)

Year	Number of Lepers Rec'd		Total.	Number on Books January 1st.	Mortality	Discharged
	Male	Female				
1866....	103	38	141		26	10
1867....	57	13	70	105	25	7
1868....	76	39	115	143	28	2
1869....	73	53	126	228	59	11
1870....	31	26	57	284	58	4
1871....	128	55	183	279	51	9
1872....	69	36	105	402	64	4
1873....	295	192	487	439	156	21
1874....	53	38	91	749	161	8
1875....	128	84	212	671	163	14
1876....	57	39	96	706	122	3
1877....	110	53	163	677	129	1
1878....	136	103	239	710	147	.....
1879....	82	43	125	802	209	1
1880....	34	17	51	717	152	10
1881....	156	76	232	606	132	.....
1882....	53	18	71	706	121	13
1883....	185	116	301	643	150	10
1884....	71	37	108	784	168	7
1885....	75	28	103	717	142	25
1886....	.....	.....	.....	653	.....	.....
	1972	1104	3076		2263	160

TABLE II.

Showing the number of Lepers received; the Mortality, and the number Discharged during the First Decade.

YEAR.	Number Received	Mortality.	Discharged
1866.....	141	26	10
1867.....	70	25	7
1868.....	115	28	2
1869.....	126	59	11
1870.....	57	58	4
1871.....	183	51	9
1872.....	105	64	4
1873.....	487	156	21
1874.....	91	161	8
1875.....	212	163	14
	1587	791	90
Number received.....			1587.
Mortality and discharged.....			881.
Number on Books January 1, 1876.....			706.

TABLE III.

Showing the number of Lepers received, the Mortality, and the number Discharged during the Second Decade.

YEAR.	Number Received	Mortality	Discharged
1876.....	96	122	3
1877.....	163	129	1
1878.....	239	147	.....
1879.....	125	209	1
1880.....	51	152	10
1881.....	232	132	.....
1882.....	71	121	13
1883.....	301	150	10
1884.....	108	168	7
1885.....	103	142	25
	1489	1472	70
Number received.....			1489.
Mortality and Discharged.....			1542.
Excess of mortality and discharges over those received...			53.
On Books January 1, 1876.....			706.
Less excess deaths and discharges.....			43.
Present on Books January 1, 1886.....			653.

TABLE IV.

Showing the nationality, number and sex of Lepers received annually from the foundation of the Settlement.

Year	Hawaiian		Mixed Hawaiians		White		Chinese		Other Nationalities		Total
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
1866	101	38	.....	.....	.....	.....	2	.....	.....	.....	141
1867	56	12	.....	.....	1	.....	.....	.....	§1	.....	70
1868	72	37	2	2	1	.....	1	.....	.....	.....	115
1869	73	53	.....	.....	.....	.....	.....	.....	.....	.....	126
1870	31	26	.....	.....	.....	.....	.....	.....	.....	.....	57
1871	125	55	3	.....	.....	.....	.....	.....	.....	.....	183
1872	69	36	.....	.....	.....	.....	.....	.....	.....	.....	105
1873	289	191	2	1	.....	.....	3	.....	*1	.....	487
1874	51	37	1	1	1*	.....	.....	.....	.....	.....	91
1875	121	82	2	2	3	.....	1	.....	†1	.....	212
1876	55	39	1	.....	1	.....	.....	.....	.....	.....	96
1877	107	53	2	.....	.....	.....	1	.....	.....	.....	163
1878	134	101	1	2	1	.....	.....	.....	.....	.....	239
1879	79	42	1	1	1	.....	1	.....	.....	.....	125
1880	31	17	2	.....	1	.....	.....	.....	.....	.....	51
1881	151	76	2	.....	2	.....	1	.....	.....	.....	232
1882	49	18	1	.....	1	.....	2	.....	.....	.....	71
1883	181	116	3	.....	.....	.....	1	.....	.....	.....	301
1884	60	37	3	.....	2	.....	6	.....	†1	.....	108
1885	68	28	2	.....	1	.....	3	.....	.....	.....	103
Total	1903	1094	28	9	16	.....	22	.....	3	1	3076

* Roratongan. † Mauritius. ‡ Manila. § Lascar.

On reviewing Table IV the following figures are arrived at:

Total Hawaiians.....	2,997
Mixed Hawaiian blood	37
Chinese	22
Whites	16
Other nationalities	4

3,076

The excess of male Hawaiians over female Hawaiians:

Males	1,903
Females.....	1,094

Excess..... 809

Therefore in twenty years the male Hawaiian lepers show an excess of 809 over the females; or, briefly, the male lepers exceed the females in the ratio of 19 to 11.

Again the excess of mixed Hawaiian blood males over female mixed Hawaiian blood is shown as under:

Males	28
Females	9
Excess	19

So that male mixed blood exceeds that of the same female race in the proportion of 3 to 1.

The excess of the male lepers over the female is no exception to the information received, on the same question, from all other countries where leprosy exists. The male lepers invariably exceed the female—(I know of no instance to the contrary)—due regard being paid to the excess of males over females in the general population.

The following tabulated statement gives the national distribution of the whites, etc.:

TABLE V.

Nationality.	No. of cases.	Remarks.
German	1	Dead.
	2	Dead.
	3	Dead.
	4	Alive: Lived 35 years here in the islands; arrived in Settlement 1879.
	5	Alive: Has lived in other countries where leprosy existed.
	6	Alive: Lived in these islands 14 years.
American ..	1	Dead.
	2	Dead.
	3	Alive: Had lived in other countries where leprosy prevailed.
	4	Alive: Lived in the country many years.
British	1	Dead.
	2	Dead.
	3	Alive: Has lived in other countries where leprosy was endemic.
Pole	4	Alive: Born in these islands; British extraction.
	1	Alive: Previously diagnosed as syphilis.
Portuguese ...	1	Dead: Had lived where leprosy was endemic (Azores).
Total	16	

The one male case in Table IV, from the Mauritius, was affected with leprosy when he arrived at these islands.

In regard to the number of lepers segregated annually, the largest number were segregated during the year 1873; in that year 487 lepers were received at the Settlement. With this large accession, the greatest number on the list reached a total of 809, comprised of 498 males and 311 females.

Again, ten years afterwards, another large reinforcement was received at the Settlement; this was in the year 1883, when 301 lepers were added to the list. On August 19, 1883, the daily recorded list shows a total of 841 souls—the largest number ever present at one time, these 841 persons being comprised of 512 males and 329 females. The smallest number of lepers received at the Settlement in any one year since its foundation was, in 1880, 51 persons, being placed on the books as fresh arrivals.

The numbers under the column head "discharged" comprise the following cases:

1. Non-lepers—these comprise the majority.
2. Sent to Honolulu for treatment.
3. Sent to Kapiolani Home.
4. Removed for crime.

The mortality figures need no special analysis into "per cents," the number of leper residents being small. The largest number of deaths in any one year occurred in 1879, when the mortality reached the total of 209, or 26 per cent.; but then it must be taken into account that there were a larger number of lepers on the list January 1st, 1879 (viz., 802), than in any other year at a similar date.

The average mortality per annum for the first decade amounts to 22 per cent. approximately, and the average annual mortality for the second decade is 20 per cent. The greatest number of deaths recorded in any one month was in May, 1880, the total reaching 38.

I have collected and tabulated one thousand eight hundred and twelve cases of leprosy, the books, unfortunately, not permitting me to analyse the whole number of native lepers received since the foundation of the Settlement (January 6, 1886); these amount, as already shown in Table IV, to 2,997 persons.

The headings of the following table show the analysis of these 1,812 cases chiefly in the matter of their insular distribution. Three of the main islands (Kauai, Oahu, and Hawaii), as regards the number of lepers to the whole population of each island respectively give almost the same result.

Maui shows an excess of lepers to its population, viz., 1 to 17 in comparison with the three other large islands. This island (Maui) also stands out prominently with "distinct excess" of lepers, calculated per one hundred inhabitants.

There are also several local districts included in the main districts in which the number of cases of leprosy segregated from these said smaller local districts appears excessive; whether so relatively to the population I have no means of accurately determining, the census returns simply giving the population in bulk.

Such excess for local districts are given in this table, the number of lepers being equal in several:

TABLE VI.

Island.	Local District.	Number of Lepers.
Kauai	Hanapepe.....	18
Oahu	Kaneohe	18
"	Heeia	15
Maui	Kaupo	15
"	Waikapu	18
"	Waihee	34
Hawaii	Waipio	37

TABLE VII.

GEOGRAPHICAL DISTRIBUTION AND PREVALENCE.

The following tabulated statement shows an analysis of 1,812 cases of leprosy, taken from the records at Kalawao (calculations approximate, fractions omitted, and native population only dealt with), showing number of lepers in each district in proportion to the population:

ISLAND.	DISTRICT.	No. of Lepers.	Proportion of Lepers to 100 population..	Ratio of Lepers to whole population of each island.....
Kauai	Koolau	48	6	1 to 23
	Halaleia			
	Puna	34	3	
Nihau	Kona	80	5	1 to 23
	Niihau			
Oahu	Honolulu	408	4	1 to 23
	Ewa	30	3	
	Waianae	13		
	Waialua	38	6	
	Koolauloa	31	3	
	Koolaupoko	35	3	
	Kona	111	7	
Maui	Wailuku	166	6	1 to 17
	Makawao	64	3	
	Hamakua	47		
	Hana	67	7	
	Kahikinui	20		
	Kohala	107	4	
Hawaii	Hamakua	75	5	1 to 24
	Hilo	125	5	
	Puna	23	3	
	Kau	38	3	
	Kona	126	4	
	Koolau	89*(1)	22	1 to 4
Molokai	Kona	34	3	1 to 29
Lanai	Lanai	3	2	1 to 50
		1,812		

*(1) Formerly kokuas, now lepers at Kalawao.

TABLE VIII.

Table showing at a glance the number of lepers in each district, etc., to every 100 persons (Hawaiians).

2 per 100.	3 per 100.	4 per 100.	5 per 100.	6 per 100.	7 per 100.	22 per 100.
Lanal.	Puna (Kauai) { Ewa Waianae Koolauloa Koolaupoko Makawao Puna (Hawaii) Kau Kona (Molokai)	Kona Hawaii Kohala Honolulu	{ Kona Kauai Niihau Hamakua Hawaii Hilo	{ Koolau Kauai Halalele Kauai Wailuku Oahu Wailuku	{ Hana Hanakua Maul Kahiki- nui Kona Maui	Koolau Molokai { Formerly ko- kuas now lep- ers at Kalawao Kamaeinas Wailua Pelekunu
* 1	8	8	8	8	2	1

CONTAGION.—The whole history of leprosy in the Hawaiian Islands from its propagation to its present rapid spread, and development, verily proves that it can only be accounted for by regarding it as a contagious disease. Whatever else may be said of its being non-contagious in other ancient countries where the disease exists endemically, these statements do not apply, or should not apply, to the disease in the Hawaiian Islands. There is very little comparison justifiable; there is no true parallelism existing. Even in other countries where the disease has existed for centuries, the question of contagion or non-contagion is not definitely settled, the evidence tending in many cases to affirm contagion; in many other to negative this conclusion.

How any competent observer concludes that leprosy is non-contagious in these islands is to me only accountable by presuming "that previous views from extraneous sources has clouded his powers of observation."

That leprosy did not prevail on these islands until many years after they were open to foreign intercourse receives great confirmation in the fact that no true aboriginal word is in use for the name of the disease. I consider this a most significant illustration of the rapid spread of leprosy within a comparatively short era. I believe it perfectly safe to affirm that did leprosy exist amongst the ancient Hawaiians they would not call it, as the present race do, "Chinese sickness." Whatever defects the Hawaiian language may have, a very casual observation shows that it was, in the highest degree, and is, a language of minuteness and exactitude; and it can scarcely be imagined that naming a slow progressive disease, like leprosy, was beyond the power of their intellect, and yet this is really what those who

claim to trace a hereditary development of the disease ask us to do. The name "mai pake" may, no doubt, have originated on the interrogation by a native of a Chinaman, "What is this disease?" The Chinaman would probably answer, "I do not know the Hawaiian word, but there are plenty of people sick with the disease in my country." I think this origin of the word is more probable than the explanation given "that the disease was called 'mai pake' because the Chinese brought it." Chinese lepers do not generally emigrate, though the disease may appear after their arrival in the islands. At what period the Chinese first entered the country I do not know; I know it is related that some Hawaiians visited China about sixty years ago. As I have before mentioned, Mr. Stewart states the disease prevailed in the year 1823. What significance the absence of a true Hawaiian word for leprosy bears is such that this very absence in itself is almost sufficient evidence to prove that leprosy has not reached its present development by hereditary influence only, and that a very strong, helping hand has been offered by contagion, the period being too short for the influence of heredity to show itself.

I repeat, on no other grounds can the spread of leprosy be explained, in the Hawaiian Islands, than by regarding the disease as contagious,—not a theory of such, but a positive proof. Were the habits of the people different to what they now are, one might have some diffidence in arriving at this conclusion, but it is not so; here we have the best field for observation. In the carelessness of the natives, in disease generally, their hospitality to the leper, and contempt of the disease, there is also present here in these islands a typical illustration of the ominous remark of Dr. Tilbury Fox—such remark generally being accepted as correct—"that it is in those places where leprosy is on the increase that the freest intermingling of the leprous and non-leprous part of the community takes place." Could the opposite conclusion be arrived at; "that although in Hawaii free intercourse exists between the leprous and non-leprous," the disease does not spread, I emphatically say no. Any calm impartial observer must arrive, sooner or later, at the conclusion that the type of leprosy prevalent in these islands is contagious, whatever else may be related of it in other countries. Many cases, undoubtedly, present some striking peculiarities, giving some credence to the view that the disease is non-contagious; but on a more minute scrutiny such cases can be explained on the principles of analogy, and did such instances arise in the prevalence of a disease we have more accurate knowledge of, they would present but slight difficulties, these being one of the many peculiar traits of a specific disease like leprosy, which is also thoroughly honey-combed with pit-falls for the unwary.

I now wish to state, that because I conclude leprosy is contagious, I think that I am carrying conviction to the mind of any person, who may happen to read this report, my object is to state facts, and hence the truth must result. Did I wish to write a paper on the non-contagious nature of leprosy, I could do so at the expense of concealing most prominent facts bearing on the view that it is contagious; on the other hand, did I wish to prove leprosy contagious, I might conceal many facts proving it non-contagious. To avoid any prospect of being charged with wholly treating leprosy in its contagious aspect, whatever cases bear on the non-contagious view, I will give great prominence to and assign to them their relative importance.

I will now state my reasons for believing that leprosy is contagious.

1. Hereditariness, as the sole agent in the propagation of the disease, will not account for its rapid increase in these islands for the following reasons:

(a) Sterility amongst the leprous is much more frequent than fertility.

(b) The majority of the off-spring of leper parents, or parent, are still-born, or die within a short period after birth. The children born at the Settlement, during the past 15 months, amount to 5, and 2 out of these alone are now alive. And again, it is doubtful if these two remaining infants will reach adolescence, and even then they may illustrate the law of atavism, which frequently is applicable to leprosy.

(c) Even allowing lepers to be fertile, are not the Hawaiian race notoriously unprolific, and shall I ask the question, whether a healthy parent is more likely to be fertile than a leper? If fertility in a marked degree does not exist amongst the healthy, then it is hardly reasonable to conclude that it will exist to a greater degree amongst the leprous.

(d) Many children, the off-spring of known lepers, have not developed the disease in their lives, although most probably hereditary predisposition was present, but leprosy never developed.

That the influence of heredity might play an important role as the sole factor in the propagation of the disease did the lepers in these islands, only aggregate a few hundred since the disease was first definitely known I quite admit; but when the number of lepers reaches into thousands, I certainly think that another source for its spread must be sought than in the influence of heredity.

2. That, invariably, when no hereditary history of the disease is obtainable, I can always elicit the facts "that contact with a leper for long or short periods had existed." I do not think the importance of this evidence can be sufficiently overrated.

3. The evidence obtained from foreigners—victims of the

disease—and from the history of their own cases, lends strong support to the view that the disease is contagious. It is not rational, but absurd, to conclude that the foreigners who now have the disease, and those also who have had the disease (now deceased) acquired it in their respective countries. How does the hereditary theory affect them? In the majority of cases, not at all. (One man from the Mauritius brought the disease already developed when he landed).

4. Some weight must be attached to the views of these foreigners themselves. They, one and all, such as are now alive, emphatically declare their belief that the disease is contagious. Some give evidence of contact (immediately followed shortly by local symptoms—direct inoculation), infection of the whole system speedily following, this again succeeded by external manifestations of leprosy within a comparatively short period.

5. The history of Father Damien, who came here in the year 1873, to exercise his calling as Catholic priest, and who has, within the past two years, been afflicted with symptoms suspiciously resembling those of leprosy; since August, 1885, outward manifestations of tubercular leprosy have appeared, placing the diagnosis beyond all doubt. It will be discussed further on when dealing with the manner the "contagion" of leprosy enters the system. I may simply add, also, that Father Damien has always maintained that the disease was contagious; his continuous residence of thirteen years has afforded him plenty of facilities for giving this opinion on the matter.

6. My own observations, from a physician's stand-point, will be stated hereafter.

7. The opinions of other experienced and reliable physicians in these islands.

8. The failure to explain its spread amongst clean families (foreign) known to have had no tendency to the disease, otherwise than by regarding the disease in a contagious light.

9. The contagious character of leprosy can be borne out in every particular by the attitude the Hawaiians adopt towards lepers. To state briefly: "The lepers are welcomed in their midst with open arms." Were these conditions reversed, the state of affairs, socially fulfilling rigid seclusion and ostracism; then leprosy spreading to any extent, it would be necessary to seek other sources of spread than contagion supplies.

Under these latter conditions, I not deny that leprosy would exist, and there would also be strong evidence in favor of the disease being non-contagious. It is from this evidence also that we receive facts practically applying to those countries where we have reports of the disease being non-contagious. I will pit climate against climate, tropic against tropic, not tropic against tropic, and take India, where Dr. Macnamara remarks of the

natives: "That although lepers move about amongst their countrymen, they are, to a great extent, isolated from them. Who ever saw a healthy native touch, much less eat with, one affected with leprosy? In many parts of India, the fact of admitting a leper to a general hospital is sufficient to drive away every other person out of it."

I now wish to offer a few remarks to illustrate the progress of disease at Kalawao and Kalaupapa amongst the kokuas, both male and female; these are cases that have been under my own observation, and have developed leprosy since my residence at the Settlement.

In the month of February, 1885, I made a medical inspection of all the kokuas residing at the Settlement; the result was as follows:

Total number male kokuas	91
" " female kokuas	87

Total.....178

The male kokuas had mostly accompanied their wives, and the females their husbands. There were one or two cases where the father accompanied his son, and a mother her son or daughter, or aunt, nephew and niece. Be the relation what it may, all these healthy people were in contact with lepers continuously.

In the month of August, 1885, I made another inspection, and in a few weeks' time I purpose doing so again.

At the date of my writing this report (February 17, 1886), twelve months after my first systematic inspection of the kokuas, the state of affairs is as follows:

Number of male kokuas who have become lepers in the twelve months, February, 1885, to February, 1886, five. Female kokuas who have become lepers during the same period, twelve—male 5, female 12; total 17. Total number male and female kokuas, therefore, are 17. Excess of female over male, 7. So that out of a total of 178 healthy people in twelve months, 9.5 per cent. have developed leprosy. Then, at the same rate of progress in twenty years, all these people will be lepers. But this is not borne out absolutely, for many Hawaiians live here year after year, marry lepers again and again, and show no external manifestation of the disease. These latter cases are not the majority, but a small minority, and bear evidence that leprosy is not contagious to every person. Many persons will say these people have it in their system. Undoubtedly this is correct in many instances which I know of, and could cite; but, whatever may be said to the contrary, I assert that a small minority of the Hawaiian race are positively exempt from the disease.

NON-CONTAGION.—From what I have just written it is evident,

I hold the opinion that leprosy is not contagious to everybody. This is the case, and there is nothing remarkable in the statement. Did everybody who comes in contact with our well-known contagious and infectious diseases,—small-pox, scarlet fever, measles, typhus, etc.,—get each of them respectively, it would be a very dismal prospect for nurses and physicians, and other attendants. I simply assert that many persons have an immunity conferred on them. What confers this special immunity is now foreign to my purpose to enter upon, but it is the generally received explanation, and I assert that the small number of cases that go to prove leprosy non-contagious fall within this special sphere of immunity.

When I see daily and hourly before my eyes a man who tells me he is perfectly well, looks well, and I conclude he is, after a medical inspection, and after these preliminaries I come to inquire into his history, and he states as follows: "I have had one, two, frequently three, and sometimes four, leper wives, and my children have died from leprosy, and I have lived here 10 years in contact with all the lepers,"—after such a story as this it would be quite reasonable to conclude that leprosy is certainly not contagious to everybody—it is not a question of degree of contagion, but non-contagion.

Again, when a woman repeats in substance such a story as the foregoing, and after all this contact and exposure, is to outward appearance healthy, one would be justified in concluding that the disease was non-contagious, certainly to this individual woman.

To illustrate further: The washer-woman for the hospital at Kalawao, has washed the soiled clothes of the worst cases, certainly many of them so, in the Settlement, for the past seventeen years. Any one who has seen advanced cases of tubercular leprosy knows the condition this soiled linen will present; nor is this her only contact with the disease, she has lepers living in her house, and, to crown all, her husbands, two in number, were lepers for years before they died; and yet, in spite of all this contact, this said woman to-day is hale, hearty and plump, and as fine a specimen of womanhood as any in the islands; her age is now 46 years.

But are these cases the rule? Certainly not, they make up a small minority in comparison with those who would have become lepers under the same exposure, and do become lepers.

These cases number, at the Settlement,

Males	26
Females	22
Total.....	48

These 48 cases give an average of 15 years each of close and intimate contact. That some will become lepers I am certain;

that others will resist all infection I am also positively certain. These are the accumulated resisters of the disease for years. One woman has lived here 19 years.

I have already shown the number of kokuas that did develop leprosy last year, viz., 17. If the disease develops at the same rate, in three years time the contagious cases will have passed the non-contagious, taking the same figures; and yet these 48 are the accumulated veterans of the Settlement. What a speck, verily! A mere drop in the ocean of the contagious cases.

I have not had leisure enough to collect all my figures, but will give the results that I arrived at, not absolutely accurate, but sufficiently so to illustrate my point.

If one hundred Hawaiians, sexes mixed, have continuous contact with leprosy for a period of years, say 5 to 15, at the expiration of that period no less than 82 would have become lepers, the remaining 18 would be clean; and these latter are the class who are illustrations of leprosy being non-contagious—not in a group, but scattered, here and there, through the vast number of contagious cases.

As an island in the ocean is generally a striking object to vision, so is an isolated case of non-contagion; and, also, as a vast continent is not exposed to view at one time, so cases of contagion are not presented in an unbroken series.

From the means at my disposal here, I have come to the conclusion that about 18 per cent. of the Hawaiian race resist the contagion of leprosy, quite a sufficient number, however, to be put in a separate division, but not a sufficient quantity to warrant a conclusion being arrived at that leprosy is a non-contagious disease.

HEREDITARY PREDISPOSITION—As an agent in causing the spread and perpetuation of leprosy, occupies a most important position. In these islands, I will place its relative rank next to contagion, giving the latter the position of chief factor at work spreading the disease in this country.

Having before stated, "that, in my opinion, leprosy was introduced here only since the advent of the foreigners," hereditary predisposition has not had opportunity to prove sufficiently the extent of its power; that it can approach its ally, contagion, is not to be thought of, owing to the unprocreativeness of the present Hawaiian race, and how hereditariness in leprosy should or could have been elevated to the first rank of propagator of the disease in these islands I am at a loss to understand.

Predisposition is a name applicable to very few diseases, the best exponent being found in leprosy; syphilis is quite erroneously placed under this heading.

I may here remark that no child born at the Settlement since my period of residence has had manifestations outwardly of

leprosy at birth. The causes, so far, that I have mentioned in connection with the spread of leprosy in the Hawaiian Islands are: First, contagion; second, hereditary predisposition. The third cause to which I attach some importance, and which has undoubtedly spread the disease is vaccination.

I can bring forward no case personally, but I have reliable hearsay evidence that after the operation of vaccination had been performed on several white children they manifested signs of leprosy, and finally developed the disease. Evidence on this same point is put forward by Sir Ronald Martin, in India, and by Professor H. G. Piffard, of New York, both reliable authorities. The possibility of such an occurrence again taking place, "now that bovine virus only is used in the operation" by the medical officers of the Hawaiian Government, is most improbable.

The extent to which each of the following factors are responsible for spreading leprosy, these factors being contagion, heredity, and vaccination, are as follows:

Contagion.....	70 per cent.
Heredity.....	28 " "
Vaccination	2 " "

I have personal knowledge of the two first, which account for almost all cases. Some few cases not coming under either heading, I have placed under vaccination, as being the most feasible situation for them, as in the Hawaiian Islands I recognize no other agents at work, such as we hear of in Norway, India, etc., where no doubt the disease has some obscure origin. In these islands no such origin need be sought for, the disease being introduced.

CONTAGIUM.—It is not my intention to enter at length on this subject, except in so far as it trenches on the domain of leprosy.

By the "Contagium of Leprosy," I wish to convey "that supposed specific material in which the infective power ultimately resides," and here I only purpose dealing with this question, in so far as the contagium of leprosy enters the body, viewed from my own stand-point. The absolute certainty of my views I wish no one to accept, as by asking or thinking this would be done I lay myself open to be charged with dogmatism.

I believe that the "contagium" of leprosy enters the system by—

1. INOCULATION.—

- (a) At broken surfaces of the skin.
- (b) At broken surfaces, fissures or chaps, on external mucous surfaces.
- (c) Possibly by punctures of insects, or the presence of parasites, scabies, etc.

2. INHALATION.

Under division 1 many cases bearing out the view that

leprosy is thus spread have come under my notice. I will relate the salient points only. A man tells me that after direct contact with a female he became aware of a small sore on a certain part of his person; this said sore not healing, he applied to a physician and was treated for syphilis; no direct benefit ensuing, he went to another physician, the result being the same, meantime he felt generally ill. Then, later on, spots appeared on his body, and his eyebrows began to diminish; finally, he went to a third physician, and was told he had leprosy. There are many such cases here at Kalawao amongst reliable narrators who could not convey a more impressive story. The female at the time not manifesting signs outwardly of leprosy, but afterwards has done so. Such cases are well known to many laymen and professional men as correct, and have laid a well-founded base on which to establish leprosy as an inoculable disease.

DIVISION 2—INHALATION: An act comparable to inoculation on external surfaces take place on internal surfaces. This is my illustration: When particles conveyed in the exhalations given off from a leper (especially in the tubercular cases attended with general ulceration) are inhaled, these presumed contagium particles are caught on the tonsils, or are carried into the bronchi, or swallowed into the stomach. They begin by penetrating the texture of the mucous membrane, "and thus effect as genuine an inoculation, with regard to the blood, as that which art or accident provides in other cases through the punctured skin."—(J. Simon).

By the first means (inoculation) many cases of leprosy are propagated, but I do not think it is nearly so frequent as by inhalation. Under this latter heading I would place the case of Father Damien, whose history I briefly relate.

Father Damien arrived at the Settlement in the year 1873, and has lived there continuously ever since.¹ He is a Belgian, of good physique, and when he arrived was 34 years of age. During all the period of his residence he has been daily and hourly in contact with lepers of various grades, many very severe. Until 1884 he felt fairly well. In that year pains in the left foot troubled him; these continued to get worse, and, in the absence of any other signs, were attributed to rheumatism. Towards the end of the year 1884 he consulted Dr. Arning (a physician who is making leprosy a special study), and to this gentleman must be given the credit of diagnosing the disease in its very early stage, as certainly not until six months afterwards did external manifestations of leprosy develop. This was Dr. Arning's diagnosis, the symptoms pointing to deposit of leprous matter in the structures connected with the peroneal nerve in the flexure of the knee. In May, 1885, there were no striking changes in his face when examined by Dr. Arning and myself. In August, 1885, a

small leprous tubercle manifested itself on the lobe of the right ear, and, from that date to the present, diminution and loss of eyebrows; infiltration of the integument over the forehead and cheeks is slowly, but certainly, going on, so that the case of Father Damien is a confirmed tubercular one, the symptoms and signs now present placing it in that class.

I believe the majority of cases of leprosy at the Settlement, had they been rigidly watched, would fall in the same category as Father Damien's. Most cases of leprosy are recorded between the ages of 30 to 50 years, so heredity is scarcely possible.

I am also clearly of opinion that leprosy is contagious at the beginning, and all through its course, and that the "exhalations" from the leper are the main agencies at work.

Women are less liable than men to the disease, I believe, owing to physiological causes peculiar to the sex; and, I explain, the many cases related of certain women having 2 or 3 husbands, and although previously clean, falling victims to leprosy, the woman herself remaining unscathed on these physiological grounds, which, when a certain age is reached and changes occur in the system—resulting in the cessation of menstruation—leprosy, which may have been dormant, proceeds to show itself.

One other point I wish to allude to, and that is that I have not met with an intermixing of cases of Tubercular and Anæsthetic Leprosy in the same family. The variety is Tubercular alone, or it is Anæsthetic alone.

My opinion as to whether I think leprosy and syphilis are homologous, is asked, and whether one disease has any connection with the other.

There is no homology between leprosy and syphilis, in my opinion, but there is an analogy. Of all the other constitutional diseases I do not think any are allied so closely as leprosy and syphilis; but they are distinct diseases. Leprosy is *sui generis*, syphilis is *sui generis*. If it were not so then the specific remedies we have for syphilis would act on leprosy also, but they do not.

To conclude this. I affirm that any observer or physician, who has studied Visceral Syphilis, will speedily see where the diseases agree, and where they do not; and those who only observe the external manifestations of syphilis will flounder among the many pit-falls which appear when least expected.

Treatment.—This is the briefest question of any to deal with, but the most disheartening to a physician, as so far no remedy has been found beneficial in each individual case.

At the Leper Settlement I have made no attempt to carry out specific treatment, except in a few cases, as most of the cases are advanced, and the internal organs I knew would be affected,

and therefore the attempt quite hopeless. I may add, that even had I wished it, I would have found difficulty in getting patients to take medicine, especially as they had been deluged with medicine without result,—with improvement for a time, then retrogression. Again, it is well known that the Hawaiian people do not approve, on the whole, of foreign medicines. I have treated the cases that fell under my charge, generally, for complications of the disease, which certainly admit of relief, these are coughs, diarrhoea, fever, anasarca, ascites, necrosis, caries of bones and teeth, stomatitis, iritis, etc. Scabies, I regret to say, prevails largely, but as soon as I can get a system of baths, I intend pursuing a vigorous course.

For the various complications enumerated above, each applied to its special ailment, I find Quinine, Salicylate Soda, Jaborandi, Squills, Senega, Ipecacuanha, Morphia, Chloroform, Amyl Nitrite, Acetate Potash, Iron, Digitalis, Ladechu, Bismuth, Sulphuric Acid, Nitric Acid, etc., all valuable. Externally, for ulcers, there is no remedy equal to Iodoform, then Resin Ointment, Tinct. Benz. Co., Tinc. Ointment, Salicylic Acid Ointment, Carbolic Acid, Nitrate Silver, etc. Gurgun oil, as a specific remedy, I am trying, and would extend its use, had I means to carry on a system of bathing.

Chaulmoogra oil I hope to give a trial to shortly, to determine its value also, and that of Gurgun oil, if any; although inwardly, I have almost made up my mind before-hand as to the effect they will have.

So far, owing to the advanced stage of the disease existing in most of the lepers here, my main treatment has been "palliative" only.

Surgery affords a large field for work, but is mostly unavailable, owing to its being held in disfavour, somewhat akin to fear; however, I do receive a few cases. This is encouraging.

With respect to "the action or effect on the disease of alcohol and opium," I regret being unable to enter upon either of these questions, with the prospect of stating my own personal experience. With these remarks I bring my report to a close, regretting my inability to deal more adequately with many of the questions asked of me.

I have the honor to remain,

Your obedient servant,

ARTHUR MOURITZ,

Physician to the Leper Settlement.

KALAWAO, Molokai, Feb. 17, 1886.

APPENDIX L.

REPORT OF DR. MOURITZ FOR THE BIENNIAL PERIOD OF 1884-1886.

His Excellency W. M. GIBSON,
President of the Board of Health.

SIR:—In accordance with your request, I have the honor to submit the following report on the Leper Settlement at Molokai, for the biennial period ending this day.

By Your Excellency's instructions, I undertook the medical supervision of the Settlement in the early part of the month of November, 1884, and from that date have acted as its sole physician.

On a prior visit, made shortly before my accepting the position as physician, I had viewed the Settlement from a medical stand-point, and found much to commend, taking into account the brief period Hawaii has entered the arena of civilization. A few minor matters, however, appeared to require rectification and possible improvement. These will now be briefly dealt with.

Soon after I had taken up my residence here, I thought it desirable to make greater facilities for obtaining medicines. Previously all supplies had been obtainable at Kalawao only. At Kalaupapa, therefore, some two and a half miles distant, I opened a dispensary in December, 1884, separate and independent of Kalawao, and judging from the number who apply for medicines and medical treatment, its establishment has proved that it meets a want.

In the hospital at Kalawao I also placed a supply of medicines, prepared for immediate dispensing, and suitable to the requirements of the most common ailments, together with instructions sufficiently explicit and simple that any person of average intelligence could master them.

When I am absent from the Settlement, I leave this supply in the charge of a Hawaiian, and have every reason to be satisfied with the manner in which he discharges his duties.

The cottage at Kalawao, which contained the dispensary, I saw fit to have moved to a more accessible and convenient situation, both for the residents and water supply. This having been accomplished, its present site meets all requirements.

These three slight alterations were the only ones which appeared to me necessary in the external medical administration.

That many glaring defects do now exist in the medical administration, no one is more conscious than I am. Some of these short-comings I am gradually improving; others do not altogether lie in my power to eradicate.

I also thought it desirable to make a general clinical inspection of all healthy persons, resident at the settlement, coming within the jurisdiction of the Board of Health, within such periods as appeared requisite.

The other matters I purpose dealing with in this report, will come under the following headings:

1. Medical treatment, etc.
2. Food.
3. Leprosy (remarking on change of type).
4. Present requirements of the Settlement.

MEDICAL TREATMENT, ETC.

The majority of the cases of leprosy here, being confirmed, I have not thought it desirable to make any attempt to carry out systematic treatment, with a view to cure the disease. Palliation, of the various complications present, has been my chief endeavor. In some instances I have succeeded; in others, without any good result accruing.

The various eye troubles, not directly amenable to treatment, have been improved, and the sight materially preserved by protectors, preventing direct access of wind, dust and bright light. I have distributed nearly 200 eye protectors to those lepers whom I judged would be benefitted thereby.

I may here remark that the prevailing weather materially influences the course of the various complications of leprosy, notably, when the respiratory tract is much affected. Damp, cold days invariably carry off those who otherwise might have lasted for a brief period, under more genial atmospheric conditions.

The Hawaiian leper presents the same good temper and genial disposition as his healthy compatriot, and, in so far as my work as a physician lies amongst the former, they cause me very little trouble. For the numerous and troublesome complications of leprosy, I have applicants daily, asking medical relief, and many of these sufferers have more than one complication active at the same period. Amongst these cases are found some who, from previous experience of what they think suits them best, prescribe for themselves. I allow this, for if I directly refuse, they decline any other medicine. At the same time, I do not always give what I am asked for; many medicines, fortunately, appearing alike, I have opportunity to substitute what I think most suitable. On the other hand, a minority of applicants ask me

what is most suitable for their cases, and thereby I am at liberty to use my professional judgment.

Indicative of the present health of the lepers, I may remark that, when I was taking a census in the third week of this present month, and obtaining the requisite information by personal house to house visitation, out of a total of over 652 lepers I only found six who were seriously ill, and confined to their homes.

I here desire to record my appreciation of the liberal manner the Board allows me to order and supply my various demands for drugs and medical appliances, especially in the absence of medical representatives from the Sanitary Committee, is this trust creditable.

The expenses of drugs and medical appliances, etc., amount to the sum of \$1,120 20 for the past sixteen months—the time I have held office.

FOOD.

In the month of July, 1885, complaint was made to me by the lepers residing in the Hospital of the quality of the food supplied to them. The statement was universal "that the poi had a pungent, disagreeable taste," the effect of this being to cause nausea, or vomiting. On investigation, I considered the complaint was justifiable, and I therefore notified the resident Deputy Superintendent, and he rectified the trouble by issuing a fresh supply of paiai. The cause of the deterioration in the quality of the poi was traceable to the detention of the paiai on board a steamer for a period of five days previous to being landed at Kalaupapa. In this instance the supply of good and wholesome food by the Board of Health was frustrated by the occurrence mentioned. Whether the present diet supplied to the lepers here is suitable in all respects may be answered in the affirmative, and that this is a safe conclusion to arrive at, I think, is evident for two reasons :

1. The absence of general complaint.
2. The incurability of the disease, and its duration here amongst those the subjects of it, compared with other countries where the disease is endemic.

Whatever may be said about other diseases being materially influenced for the better by special diet, I think it must be admitted that leprosy, being hitherto incurable, and until more convincing evidence is adduced of the supposed disadvantages connected with certain diets, the leper may be safely allowed to consult his own inclination, especially in these islands, where the staple food of the aborigines has been almost wholly confined to poi and fish for centuries, and which alone satisfies them.

On the vexed question, which has been brought forward here, of "Whether the exclusive use of certain foods is the chief etio-

logical factor spreading leprosy in these islands?" I think the evidence bearing on this point very soon compels those who have paid any attention to the true investigation to conclude that leprosy is much too subtle and specific a malady to be influenced by dietetic regimen, except in so far as grave departures from the usual well recognized standards are indulged in. These remarks are quite as applicable to all morbid states as to leprosy. The role, therefore, that diet plays in producing leprosy in these islands is, in my opinion, nil.

I here beg to offer a few remarks on what a most valuable addition milk is to the present diet, supplied by the Board of Health to lepers; but this article, as now served out, is too meagre in quantity, and I would recommend that an increased supply be provided, and greater facilities be afforded for distribution. This can be easily accomplished at a merely nominal cost, with the material at present at the command of the Board of Health.

LEPROSY—(Remarking on the possible change of type):

The total number of lepers residing at the settlement to-day amounts to 652, comprising both sexes and all ages. This total is made up of 333 tubercular cases, 204 anæsthetic cases; the remainder, the mixed cases (115), make up the balance. On interrogating intelligent natives and foreigners resident here for the past five years and more, they invariably agree in stating that the tubercular form of leprosy bears a much smaller proportion to the anæsthetic than it did when they arrived at the Settlement. On seeking further confirmation amongst the written records, I found evidence agreeing with the correctness of the statement, "that the tubercular leprosy is not as prevalent a form of the disease as it was some years previously." I am, therefore, inclined to conclude that leprosy is gradually undergoing a change of type, and this of a more conservative nature.

Tubercular leprosy may be termed "Rapidly progressive, or most active." Mixed leprosy (the connecting link between tubercular and anæsthetic) may be also termed "Less rapidly progressive, or moderately active." Anæsthetic leprosy is the "Least rapidly progressive, or active," and empinges on the term conservative. I may here mention that I have heard the opinion expressed by many able physicians in Europe that, although leprosy does not now exist, yet amongst the inhabitants of those countries where it prevailed until a recent date, various obscure nervous affections occur from time to time which are most probably lingering relics of anæsthetic leprosy. The connection of this statement with what I have mentioned on the relative prevalency of the forms, now present in the Settlement, is one of importance, and further investigation of this matter will repay the time spent in doing so.

THE CHIEF REQUIREMENTS OF THE SETTLEMENT.

These are—First : Convenient and properly constructed baths and wash-houses, supplied with hot and cold water, and also furnished with suitable appliances for personal ablution and cleaning of clothes. With these powerful auxiliaries, there might be some possibility of eradicating one of the greatest banes of the Settlement, viz., Scabies. From the measures used now to deal with this troublesome affection, and in use in the past, to expect a successful result is not to be thought of.

Secondly : Not quite so needful as the above, but which would be highly advantageous to have supplied, are thirty iron single bedsteads for the hospital to replace the wooden bed supports now in use, which are worn out and harbor vermin, with consequent annoyance to the occupants of the beds. A separate basin and jug for each patient would also be a desideratum.

In this connection I hope that all those Hawaiian representatives elected to the Legislature of 1886 (who may by chance read this report, and who have, or profess to have, any feelings of commiseration for their fellow countrymen and women now in exile here as lepers), will endeavor to obtain the appropriation of sufficient funds to enable the Board of Health to carry out these truly necessary requirements in as efficient a manner as is possible, which will much conduce to the comfort of their afflicted fellow countrymen.

Appended to this report will be found tabulated statements showing various information connected with the Leper Settlement for the biennial period ending March 31, 1886:

Table A—Showing arrivals, sex, nationality, and previous residence (island).

Table B—Census taken personally, completed on March 17th, 1886, and corrected to date, showing number of lepers, ages, sex, and nationality.

Table C—The date of arrival at the Settlement, or entry on the leper list, of all lepers now alive, and sex.

Table D—The quota of lepers, now alive, furnished by each district of the several islands, with their place of residence at the Leper Reservation.

Table E—Various items, Mortality of past biennial periods, Discharges, etc.

Table F—Monthly mortality, sex.

Table G—The year of arrival of those who have died, and the number who have died in the past biennial period belonging to these respective years.

On reviewing Table D, Maui will be noticed to furnish more lepers relatively to its population than any of the other islands. This result coincides with the statements contained in my special report to Your Excellency.

In concluding this report, I beg to tender my thanks to the Board of Health for their courteous and speedy compliance with my request for improved house accommodation, befitting the comfort of a resident physician.

I have the honor to remain,

Your Excellency's obedient servant,

ARTHUR A. MOURITZ,

Physician to the Leper Settlement, and Island of Molokai.

Kalawao, March 31, 1886.

One or two items not included in the following tables, I here state in brief form, of the total number of lepers in the Settlement this day:

333	Suffer from tubercular leprosy
204	" " anæsthetic leprosy
115	" " mixed form of leprosy.

652

Again, in degree of progress, 254 are advanced
174 are moderate
224 are slight cases.

652

The number of couples married, or who live as such, sum up '87.

Of a total of twenty-six children born in the Settlement, who vary in age from 3 years to 14, nine up to this date are lepers; the remaining seventeen show no outward manifestations of the disease so far.

Included in the mortality figures, Table F, for the year 1884-85, are two Chinese and four males of mixed Hawaiian blood. Also, in the same Table F for the year 1885-86, three males and two females of mixed Hawaiian blood are included.

In connection with Table G, all lepers segregated in the years 1869, 1868, 1867, and 1866 are dead. The last survivor, a female, of the lepers who arrived here in 1866 died in February, 1884; and of those lepers who arrived in 1869 the last survivor, a male, died in October, 1878.

TABLE A.—1.

Number of lepers received during the past biennial period, or entered on the list here.

Year.	Hawaiian. M. F.	Mixed H. M.	Chinese.	German.	Belgian.	Pole.	Guam.	Total.
1884-85..	68 36	1	5	0	0	1	0	111
1885-86..	48 24	2	1	1	1	0	1	78
Total..	116 60	3	6	1	1	1	1	189

TABLE A.—2.

Showing the number of lepers received from the various Islands, Hawaiians only.

Year.	Hawaii.	Mau.	Oahu.	Kauai.	Molokai.	Total.
1884-85.....	31	24	23	11	15	104
1885-86.....	15	13	8	7	29	72
Total.....	46	37	31	18	44	176

TABLE B.—Census of Lepers.

Ages.	Hawaiian.		Mixed Haw'n.		Ch'se.	Germ'n	Brit'h	Pole	Bel'n	G'am.	Total
	M	F	M	F							
1 to 10 yrs..	11	6	0	0	0	0	0	0	0	0	17
10 to 20 yrs..	75	45	4	0	0	9	0	0	0	0	124
20 to 39 yrs..	82	38	5	0	9	0	1	0	0	0	135
30 to 40 yrs..	77	34	3	1	4	0	0	0	0	1	120
40 to 50 yrs..	54	50	1	0	3	1	1	1	1	0	112
50 to 60 yrs..	56	33	0	0	3	2	0	0	0	0	94
Over 60 yrs..	32	18	0	0	0	0	0	0	0	0	50
Total.....	387	224	13	1	19	3	2	1	1	1	652

TABLE C.

Showing the year of entry on the leper list of all lepers now alive, and sex.

Year.	Males.	Females.	Total No. Alive.
1870	3	3	6
1871	3	2	5
1872	5	3	8
1873	10	4	14
1874	4	4	8
1875	10	6	16
1876	5	0	5
1877	9	4	13
1878	14	13	27
1879	22	15	37
1880	27	14	41
1881	32	19	51
1882	42	18	60
1883	94	55	149
1884	67	26	93
1885	64	32	96
1886	16	7	23
	427	225	652

TABLE D.

The quota of lepers now alive, from each District of the several Islands. Hawaiians only.

Island and Districts.	Kalawao.	Makanalua.	Kalaupapa.	Hlopi.	Total.
HAWAII.					
Kohala	25	2	17	2	46
Kona	21	4	18	1	44
Kau	9	1	4	3	17
Puna	6	0	1	0	7
Hilo	18	2	22	3	45
Hamakua	12	1	13	1	27
	<hr/> 91	<hr/> 10	<hr/> 75	<hr/> 10	<hr/> 186
MAUI.					
Kona	24	1	7	1	33
Wailuku	34	6	18	0	58
Makawao	10	12	13	0	35
Hamakua	0	0	13	1	14
Hana and Koolau..	12	1	19	2	34
Kahikinui	11	1	6	0	18
	<hr/> 91	<hr/> 21	<hr/> 76	<hr/> 4	<hr/> 192
OAHU.					
Kona	55	3	45	10	113
Ewa & Waianae...	4	1	8	2	15
Wailua	8	0	1	0	9
Koolauloa	0	0	1	0	1
Koolaupoko	7	0	11	0	18
	<hr/> 74	<hr/> 4	<hr/> 66	<hr/> 12	<hr/> 156
KAUAI.					
Puna	7	1	8	0	16
Halalea	2	0	2	2	6
Koolau	9	1	3	4	17
Kona and Niihau..	2	0	7	1	10
	<hr/> 20	<hr/> 2	<hr/> 20	<hr/> 7	<hr/> 49
Molokai	11	2	13	2	28
	<hr/> 20	<hr/> 2	<hr/> 13	<hr/> 2	<hr/> 28
Total	287	39	250	35	611

TABLE E.

Table reviewing for the whole period the leper segregation, etc.,
on Molokai.

Biennial year.	Arrivals.	Discharged.	Deaths.	Biennial Deaths.	Total
1866-7.....	141	10	26.	32	
1867-8.....	70	7	25	27—	59
1868-9.....	115	2	28	35	
1869-70.....	126	11	59	57—	92
1870-1.....	57	4	58.	54	
1871-2.....	183	9	61	59—	113
1872-3.....	105	4	64	69	
1873-4.....	487	21	156	174—	243
1874-5.....	91	8	161	145	
1875-6.....	212	14	163	167—	312
1876-7.....	96	3	122	113	
1877-8.....	163	1	129	148—	261
1878-9.....	239	0	147	174	
1879-80.....	125	1	209	178—	352
1880-1.....	51	10	152	152	
1881-2.....	232	0	132	126—	278
1882-3.....	71	13	121	130	
1883-4.....	301	10	150	184—	314
1884-5.....	108	7	168	138	
1885-6.....	103	25	142	121—	259
1886	23	0	20		
Total.....	<u>3099</u>	<u>160</u>	<u>2283</u>	<u>2283</u>	<u>2283</u>

Total number of lepers received.....3,099

Total number discharged and died.....2,443

Total number remaining.....656

By my census number of lepers this date.....652

Number unaccounted for.....4

TABLE F.

Table showing mortality for the past biennial period.

Month.	1884 and 1885.			1885 and 1886.		
	Male.	Female.	Total.	Male.	Female.	Total.
April.....	8	9	17	3	9	12
May.....	8	9	17	6	7	13
June.....	4	6	10	8	9	17
July.....	9	4	13	8	5	13
August.....	3	2	5	4	3	7
September....	5	6	11	5	0	5
October.....	4	3	7	9	2	11
November....	4	3	7	7	4	11
December....	6	4	10	9	3	12
January.....	13	4	17	6	4	10
February.....	3	8	11	4	2	6
March.....	8	5	13	2	2	4
Total..	75	63	138	71	50	121

Grand total for biennial period..... 259

TABLE G.

Showing the year of arrival and the number belonging to the several years who have died during the past biennial period.

Year of arrival.	1884-85.	1885-86.	Total.
1872	1	1	2
1873	8	1	9
1874	1	2	3
1875	5	1	6
1876	5	6	11
1877	5	7	12
1878	19	11	30
1879	14	6	20
1880	2	4	6
1881	32	20	52
1882	11	5	16
1883	31	39	70
1884	4	11	15
1885	0	7	7
Total.....	138	121	259

MANAWAI, MOLOKAI, March 27, 1886.

His Excellency W. M. GIBSON,
President of the Board of Health.

SIR:—At the time of my undertaking the position of Resident Physician for the Leper Settlement, Your Excellency having notified me "that it would be desirable to make my services available, to some extent, for the people resident on the Kona side of this island," which, in so far as the population is concerned, extends from Kaunakakai to Halawa, I therefore have endeavored to place some portion of my time at the disposal of the inhabitants residing on the leeward side for the past four months, opportunity to do so earlier not having presented itself. I find here the natives very pleasant to deal with, and, in so far as the short time at my disposal has allowed me to observe, they pay more attention to following out the treatment of a foreign physician; I judge this from the numbers who apply continuously for the relief of many ailments, some quite incurable. Payment has been offered to me for my services both by those who I judged could afford, and those who could not afford to do so; in all instances I have declined remuneration. Whether a small payment should be required sufficient to cover the cost of the medicine supplied to each applicant is a difficult matter to decide; at the same time, I think it advisable some conclusion should be arrived at. The wholesale pauperization of the Hawaiian community is not a very desirable light to view the matter in, yet this is really the state of affairs all over the group, where no fee is demanded for medical services. I think this matter should receive the attention of the Legislature. If a man is supplied with medicine gratis, why not with food and clothes, which are more necessary for the maintenance of health?

In the month of February last an epidemic prevailed here, of which diarrhoea was the prominent feature. On observing the course of some of these cases for a few days, I was led to suspect they were hybrid forms of typhoid fever, the type being mild; some cases died, but the majority recovered. Sporadic cases continue to occur from time to time.

I have ascertained that this "mai hi," so called, has occurred at similar seasons yearly, the prevailing atmospheric conditions appearing to exercise some influence.

No other sanitary matters call for comment.

I have the honor to remain,

Your Excellency's obedient servant,

ARTHUR MOURITZ,

Physician to the Leper Settlement and Island of Molokai.

APPENDIX M.

SPECIAL REPORT FROM REV. J. DAMIEN, CATHOLIC PRIEST AT KALAWAO, MARCH, 1886.

A Personal Experience of Thirteen Years' Residence and Labor among the Lepers at Kalawao.

KALAWAO, March 11, 1886.

To His Excellency WALTER M. GIBSON,
President of the Board of Health.

DEAR SIR:—I herewith enclose the report on my observations and action at the Leper Settlement during a residence of thirteen years, which Your Excellency requested me to prepare. Hoping that it will meet your views,

I remain Your Excellency's most humble servant,
J. DAMIEN, Catholic Priest.

By special providence of Our Divine Lord, who, during His public life showed a particular sympathy for the lepers, my way was traced towards Kalawao in May, A. D. 1873. I was then 33 years of age, enjoying a robust, good health—Lunalilo being at that time King of the Hawaiian Islands, and His Excellency E. O. Hall President of the Board of Health.

A great many lepers had lately arrived from the different islands; they numbered 816. Some of them were old acquaintances of mine from Hawaii, where I was previously stationed as a missionary priest; to the majority I was a stranger.

The Kalaupapa landing-place was at that time a somewhat deserted village of three or four wooden cottages and a few old grass houses. The lepers were allowed to go there only on the days when a vessel arrived; they were all living at Kalawao—about eighty of them in the hospital, in the same buildings we see there to-day. All the other lepers, with a very few kokuas (helpers), had taken their abode further up towards the valley. They had cut down the old pandanus, or puuhala groves, to build their houses, though a great many had nothing but

branches of castor oil trees with which to construct their small shelters. These frail frames were covered with ki leaves (*Dracæna terminalis*), or with sugar-cane leaves—the best ones with pili grass. I myself was sheltered during several weeks under the single pandanus tree, which is preserved up to the present in the churchyard. Under such primitive roofs were living pell-mell, without distinction of ages or sex, old or new cases, all more or less strangers one to another, those unfortunate outcasts of society. They passed their time with playing cards, hula (native dances), drinking fermented ki-root beer, home-made alcohol, and with the sequels of all this. Their clothes were far from being clean and decent on account of the scarcity of water, which had to be brought at that time from a great distance.

The smell of their filth, mixed with exhalation of their sores, was simply disgusting and unbearable to a new-comer. Many a time, in fulfilling my priestly duty at their domiciles, I have been compelled not only to close my nostrils, but to run outside to breathe fresh air. To protect my legs from a peculiar itching which I usually experienced every evening after my visiting them, I had to beg a friend of mine to send me a pair of heavy boots. As an antidote to counteract the bad smell, I made myself accustomed to the use of tobacco, whereupon the smell of the pipe preserved me somewhat from carrying in my clothes the obnoxious odor of the lepers. At that time the progress of the disease was fearful, and the rate of mortality very high.

These are a few of my recollections of what I have seen and experienced at the beginning of my labor here. The miserable condition of the Settlement at that time gave it the name of a living graveyard, which name I am happy to state, and hope to prove hereafter, is to-day no longer applicable to our place.

From the accession of King Kalakaua to the Throne up to the present time, His Majesty's Government, assisted by Christian charity, has endeavored, little by little, according to means and circumstances, to improve the situation of the lepers, and to make them more comfortable.

Consulting my own observations and experiences only, without any memorandum book or register, I intend to show here what contributes much towards the comforts and benefits of lepers, and what is obnoxious or injurious to them, and will prove these two statements by putting our good situation and comfort in parallel with what I found here at my arrival, as already explained.

THE DIET OF THE LEPERS.

The food on which a leper has to live exercises a great influence on the disease. Our Hawaiian taro, containing a great quantity of starch, and being easy of digestion, is our best vegetable. So far, I have never seen any bad effects from it,

even in fevers and other temporary ailments to which our lepers are so often subjected to. Hawaiian people in general, but especially our lepers, cannot go well without it. I remember that, some ten years ago, the place having been about three months without taro on account of the scarcity of that vegetable, several deaths occurred in consequence of it, and the majority of the people looked emaciated, although they had plenty of rice and sweet potatoes.

The administration having to supply weekly from six to seven hundred people, each with twenty-one pounds of cooked taro, a few words concerning the manner how it is obtained may be desirable.

At the northern side of Molokai are three large valleys, viz., Halawa, Wailau, and Pelekunu, in which the cultivation of taro is the chief business of a considerable number of natives. On them especially we have to rely for our regular supply. The high cliffs preventing all overland road traffic, the cooked taro, or paiai, has to be brought by sea either in open boats or a small schooner, as was done from the beginning, or in a small steamer latterly.

The steamer's service has been highly appreciated by the public on account of its regularity, schooners and boats being often prevented by calm or rough weather from arriving when the food is wanted; unavoidably, our people are then deprived of their good poi, which is left to rot where it was cooked, causing great loss to all concerned. If poi cannot be obtained, the issue of rice or hard bread takes its place, of which there is always a certain quantity on hand, though it is recognized that, with the exception of the Chinese, neither native nor foreigner could live on rice as principal food.

A certain number of our people, with their more or less mutilated hands, succeed in raising a few sweet potatoes, which answer well for a change in the diet, or in case of emergency. Unfortunately some of our Hawaiians are much addicted to the use of a certain beverage made of sweet potatoes, which they allow to ferment, and thus obtain an obnoxious, intoxicating drink. They are very fond of it, but it makes them excited, and has a bad effect on their system, as have all other alcohols; and I wish to express here my sincere thanks to our local administration for having wisely prohibited the use of it.

Besides their regular food, a pint of good milk provides them advantageously with a wholesome, nourishing beverage in the line of diet. The question naturally occurs to the mind of the reader how can a sufficient quantity of milk to supply such a number of people be procured? May I be allowed to explain my views on this:

This Settlement, in the greatest part, affording the best kind of grazing for stock, I would suggest to the administration with

all my might to increase as much as possible the number of good milch cows. Unfortunately, on account of the great amount of meat wanted, about five thousand pounds a week, and the frequent failure of the arrival at the regular time of beef-cattle, our butchers are sometimes obliged to kill off more or less of our valuable milk stock, which keeps the latter on a decrease, and therefore lessens terribly the supply of milk.

Let me regretfully state, it is now several years, up to the present day, that not one-tenth of our lepers outside of the hospital yard have been enabled to enjoy the benefit of a small daily supply of milk.

I beg leave to be allowed to make here a suggestion for the benefit of the Board of Health and for the lepers. May it be proposed at the next Legislature to make, besides the regular appropriation for the support of the lepers, an additional one, such as to provide the necessary means for buying at once as many head of cattle as our beautiful plain for grazing can support—say from 500 to 1000 head, of which a certain number should be used for breeding and milk, and the rest for beef cattle. In regard to salmon, as a substitute for meat, I simply will state that it may do once in a while, but the less the better.

THE WATER SUPPLY OF THE SETTLEMENT.

From the landing-place of Kalaupapa up to Kalawao we have no regular water stream. Fortunately, at the upper part of the Kalawao valley there is one, but the water is not very abundant, though sufficient, if properly managed, to supply this one village. When I first arrived here the lepers were obliged to carry their water in oil cans from that gulch on their shoulders, or on horses, under the greatest difficulty; there also they used to wash their clothes. The scarcity of water at that time accounted, to some extent, for their living very dirty.

In the summer of A. D. 1873, we received some water pipes, and all our able lepers were only too willing to help in laying them, and in building a small reservoir. Since then Kalawao has been well supplied with good water for drinking, bathing, and washing, and has been proved to be a better place for living than Kalaupapa, where the people continue to resort to rain or brackish water, and in dry seasons they are obliged to come to Kalawao for it.

On studying this question of water supply, I was informed that at the terminus of the valley called Waihanau (water arise), which valley is located a little more than one mile south-east of Kalaupapa, and is a natural reservoir. At one time in company with two of our intelligent white men and some of my boys, I went to investigate the truth of it, and, after a two thousand feet of travelling in the gulch, we arrived at this truly beautiful reservoir, built by Nature's hand in the form of a circular basin;

its diameter in one direction is 72 feet, and 55 in the other. On sounding its depth we found 12 feet of water at a short distance from the bank, and 18 feet towards the centre. The water being ice-cold, none of my boys dared to swim across to ascertain its true depth close to the high cliff, where probably it is deeper. The water looks very clear, and has an excellent taste. I should remark here the statement which a native who, during the period of ten years, has made it his business to deliver water to any part of Kalaupapa for a certain fee, made to me, viz.: "That if no other source in the vicinity affords any water during very dry seasons, this basin has never failed to furnish any amount needed." The above statement was acknowledged to be true by a great many more of the old residents who had seen that reservoir, and confirmed it. This, and the large over-flow in connection with the drainage from above, leaves me to conclude that there must be a large feeding source below. This reservoir is perfect and permanent in itself, without incurring any expense or labor.

Now, instead of going to Waikolu to obtain a water supply for Kalaupapa, as was intended, which would be, besides the difficulty of labor of building a reservoir, and for laying from such a distance, say over five miles, the amount of pipes required for that purpose, a very large expense to the Government, therefore I simply recommend the laying of good pipes from this Waihanau reservoir. The question of supplying water for Kalaupapa has been for a long time under discussion, and never thoroughly investigated, under the impression that it would cost too much, and there the matter rests at present.

My desire being to see the work carried on without any further delay, once I was sure of getting this supply of beautiful water at a comparatively short distance; and, wishing to give all the information necessary, I have taken the pains to measure the exact distance, which I found to be from the reservoir to the Kalaupapa store-house thirteen thousand six hundred and eighty (13,680) feet. All this distance is on an uninterrupted, gradual decline; and having on hand a better reservoir, and a surer supply of water than we have at Kalawao with a 2-inch pipe for half the distance, and 1½-inch for the remaining part, without a doubt the Kalaupapa village can be abundantly supplied with good, pure water. And having here a man capable of executing such a work, with many hands to assist him, I think that the expense above the cost of the pipes would be but a trifle.

THE DWELLINGS OF THE LEPERS.

Good ventilation being in general one of the first conditions of hygiene, it is much more necessary for our lepers on account of the foetid exhalations from them being much greater than from any other disease.

In previous years, having nothing but small, damp huts, nearly the whole of the lepers were prostrated on their beds, covered with scabs and ugly sores, and had the appearance of very weak broken down constitutions. In the year 1874 the great question was—how to improve the habitations of the unfortunate people, the Government appropriation being at that time barely enough to provide them with food?

During that winter a heavy south wind blew down the majority of their half-rotten abodes, and many a weak leper laid there in the wind and rain, with his blanket and clothes damp and wet. In a few days the old grass beneath their sleeping mats began to emit a very unpleasant vapor. I at once called the attention of our sympathizing Agent to the fact, and very soon there arrived several schooner loads of scantling to build solid frames with. All lepers who were in distress received, on application, the necessary material for the erection of the frames, with one inch square laths to thatch the grass or sugar-cane leaves to. Afterwards rough N.W. boards arrived, and also the old material of the former Kalihi hospital. From private and charitable sources we received shingles and flooring. Those who had a little money hired their own carpenters; for those without means the priest, with his leper boys, did the work of erecting a good many small houses. Besides, some new comers who had means built their dwellings at their own expense.

In 1878, after the inspection of the Settlement by a special committee, of which Your Excellency, then a member of the Assembly, was chairman, sent by the Legislature to Kalawao, the Board of Health having obtained a larger appropriation by a special recommendation of that committee, at once erected a good many comfortable houses, and also provided several other comforts for the lepers, of which they were greatly in need of.

Lime has always been supplied by the Board of Health gratuitously for whitewashing the cottages, and thus, little by little, at comparative small expense to the Government, combined with private or charitable resources, were inaugurated the comfortable houses which constitute to-day the two decent-looking villages of Kalawao and Kalaupapa. I estimate the number of houses, at present, both large and small, somewhat over three hundred, nearly all whitewashed, and, so far, clean and neat, although a number of them are not yet provided with good windows. These houses, of course, cannot have the proper ventilation they need, and naturally create an unpleasant and unhealthy smell, I therefore humbly pray that the Board be kind enough to take steps and see that this still-existing evil be soon remedied. In conclusion, I am happy to remark that, if I compare the present with the past, the unfortunate people of to-day are not only more comfortable and better off in every respect, but their disease in general is a great deal milder and less progressive, and,

in consequence, the death-rate is not so high. This is greatly due to the improvement in the houses.

THE CLOTHING OF THE LEPERS.

The Settlement being situated at the northern side of the island, and backed at the south by very high and steep mountains, the climate is naturally cool. The winter season brings forth generally a long spell of cold weather. The disease, too, at a certain stage, interferes much with the free circulation of the blood, and therefore our lepers often complain of cold. Those who have suitable and warm clothes to protect themselves from the inclemency of the weather resist it generally very well; but for those who, through neglect or destitution, have barely enough to cover their nakedness, the cold and damp weather has a bad effect. They then begin to feel feverish, and cough badly; swelling in the face and limbs sets in, and if not speedily attended to the disease generally settles on the lungs, and thus hastens them on the road to an early grave. On my arrival I found the lepers in general very destitute of warm clothing. So far they had received from the Administration a suit of clothes and a blanket; but some of them being very neglectful and filthy, in a few months nothing remained but rags. Those who had friends in the outer world were fortunate in receiving from time to time a few articles of clothing, but the friendless and the poor suffered greatly. There was no store at the time within the limits of the Settlement where they could buy a new garment or other necessities, and those who received or could earn some money had to entrust it to the captain of the schooner to buy for them what they were in want of.

We all greatly felt the necessity of a suitable market store, and, on a very sound principle, the Molokai store was inaugurated by the Board of Health in the summer of 1873. To start with, a thousand dollars out of the appropriation was invested to lay in the first stock, and with a certain percentage above the cost price to cover current expenses, the store has, since then, been running on its own account, supplying our people with any article they may wish to buy. Every year the Board issues an order for six dollars to each leper to enable them to buy at the said store what they are in want of, especially in the line of clothing. So far, this store has proved to be a success, and a great convenience to the people here, and we could not do very well without it.

Besides the allowance by the Board of Health, Christian charity has given us a helping hand in the matter of clothing, and assisted us to our great satisfaction. In previous years it was nothing unusual to receive from time to time a cart-load of clothing for distribution to the needy; for instance, such as was received a year and a half ago from the hands of Her Majesty

Queen Kapiolani, and those who assisted her in filling the leper subscription. Thanks for aid in the past. May the future prove that untiring perseverance of charity continues to assist the Board of Health in supplying the unfortunates of Molokai with all their necessities—especially with warm clothing, because, may I here remark, that the yearly allowance of six dollars to provide clothes and other indispensable articles is quite insufficient for those who have no private means, and no friends or relatives to give them a helping hand. I beg to lay this statement, based on a long experience, before the Honorable Board of Health for future consideration.

The allowance granted by the Board, combined with Christian charity and some private industry, of which I intend to speak of hereafter, has greatly ameliorated the condition of our lepers, and provided them with comparatively good clothes.

EXERCISE FOR THE LEPERS.

Leprosy is a constitutional disease by which, generally, the circulation of the blood is partially obstructed, the nerves and muscles more or less paralyzed, and the limbs are often disabled in one place or the other, which varies in almost every case.

A person afflicted with leprosy, who quietly gives himself up to the ravages of the disease, and does not take exercise of any kind, presents a downcast and sloughy appearance, and threatens soon to become a total wreck. Therefore exercise, as a daily occupation, is highly commendable to invigorate the system, giving a fresh impetus to the general movement of the muscles and to the free circulation of the blood, thus averting many pains, sores, and other consequences of a prostrated constitution.

In former days (from 1866 to 1873) all the lepers being collected at the rather small village of Kalawao, the majority of them passed their time in sleeping, drinking, and playing cards, while only a few others cultivated the fields; and horses being limited at that time, a minimum number only of the inmates could enjoy the exercise of a horse ride.

Later on, all that tract of land at Kalaupapa having been annexed to the Leper Settlement, travelling was at once increased to a great extent; going from one village to the other became not only a healthful exercise and pleasure, but of a frequent necessity; horses too have increased, and are easily procured. This tract includes a very fertile piece of cultivable land; over two hundred acres are fenced in along the foot of the mountains. Every leper is privileged to occupy any vacant portion of it he may choose to cultivate, as some were already accustomed to do in the Kalawao fields.

Travelling on foot, riding on horseback, and cultivating the soil are the most healthy occupations of our lepers. Let me, therefore, bring to notice that, up to the present date, about nine-

tenths of the entire population are enjoying these invigorating occupations and exercises, while previously only about one-tenth could do so. Such daily exercises as can be obtained here does not only strongly aid in checking the disease in its rapid progress, but also averts many ailments which otherwise might befall the victim. Inducements of this kind, in regard to daily exercise for the welfare of all afflicted which this Settlement affords, cannot likely be got up in any other asylum in the world.

In regard to the wholesome exercise obtained by cultivating the soil, a few facts showing how it has been, and should continue to be encouraged, may here be brought under observation. Soon after that piece of land mentioned above had been put at the disposal of the lepers many, whose hands were not too much mutilated, began at once to plant a patch of sweet potatoes, and very soon had an abundant crop.

During winter when the boats, which had to supply the Settlement with taro, were prevented from arriving on account of the bad weather, the local administration was fortunate enough to get a weekly supply of sweet potatoes from those who had a quantity at their disposal, and thus not only prevented a temporary famine, but the money usually paid to the outsiders for *pai*ai was paid into the hands of our lepers, and, little by little, money came into circulation among the poor people. This being a great encouragement, very soon the majority had some potatoes of their own planted, and shortly afterwards they petitioned the local administration to obtain instead of their weekly rations its equivalent in money. This having been granted, numbers of lepers availed themselves of this opportunity to obtain some cash to buy their little necessities with.

This system of paying money, instead of giving the weekly supply, continued for about eight years, varying in amount according to the harvest of sweet potatoes, and sometimes through the deficiency of taro. Besides the great benefit of a healthy exercise for the sick, their monthly ration-money not only alleviated the condition of those who availed themselves of it, but brought some money into circulation, and created between the two villages many other kinds of small industries.

The Leper Settlement store, too, at that time had a larger business, because there was money in the hands of the people who, in general, called there to provide for all their different needs.

Up to within recently the people were in comparative ease at the Settlement, but at present the system of paying the equivalent of rations, on account of abuses, having been taken away, though they have enough to eat, they are, nevertheless, getting in very poor circumstances. This system was very beneficial for the health and comfort of the lepers, as I have shown, and not

CXIX

any more expensive to the Board of Health, therefore, in the interest of the great majority, I humbly suggest that the Administration will have the kindness to resume the old practical system.

THE KOKUAS, OR ASSISTANTS, WHO ACCOMPANY THE LEPERS TO THE SETTLEMENT.

On this important subject, distinction has to be made between married and unmarried kokuas. I think it is but justice, and in accordance with Divine and humane law, that faithful husbands and wives of lepers should be allowed to accompany their partners to their exile at Kalawao.

In the fulfillment of my duties as priest, being in daily contact with the distressed people, I have seen and closely observed the bad effect of forcible separation of the married companions. It gives them an oppression of mind which, in many instances, is more unbearable than the pains and agonies of the disease itself. This uneasiness of the mind is, in course of time, partly forgotten by those unfortunates only who throw themselves into a reckless and immoral habit of living. Whereas, if married men or women arrive here in company with their lawful mates they accept at once their fate with resignation, and very soon make themselves at home in their exile. Not only is the contented mind of the leper secured by the company of his wife, but the enjoyment of good nursing and assistance, much needed in this protracted and loathsome disease, and which no other person could be expected to impart.

I am happy to be able to state that the marriage ties of lepers have been more respected by His Majesty's Government during the past few years than they used to be; the physical and moral life at the Settlement has greatly improved, and the lepers are much better taken care of. Besides this, our good kokuas are not only of great help and assistance to individual lepers, but they are also of great value to the local administration for carrying on all work needed for the welfare of the place. May I bring to the notice of the honorable members of the Board of Health that not only is our Settlement benefited by such kokuas, but the public at large are rid of a dangerous element; and I must assert that it is my solid opinion that all persons, with a very few exceptions, who have cohabited in the matrimonial state a certain length of time with a leper are a standing menace to society at large, of which only too many proofs have unhappily come under my personal observation. I here leave the medical profession to settle to what extent the danger of contagion or non-contagion through cohabitation may extend.

I am happy to give the present Board of Health credit for their lenient action in this important matter, at the same time I am obliged to mention that I disapprove the coming of all others

but married kokuas to the Settlement with the intention of making it their place of abode. My disapproval of seeing unmarried kokuas settle here is based on the following reasons :

1. Because, with the exception of a few old people, unmarried kokuas are not generally faithful and persevering in assisting those patients in whose favor they were permitted to come here.

2. They are, in general, a source of immorality, and a temptation to lead the lepers into bad habits, and, through their bad example, sometimes create trouble in the place.

3. Because, having no natural tie here they, after a long intimacy with the lepers, may leave the place whenever they choose; and, although the disease may not yet be visible, it is highly probable that they carry the germs of it to their homes, and thus become a well-fitted medium to spread the disease amongst their numerous friends.

4. They are of very little use here, if of any use at all. They will not do anything for the poor sufferers except for payment, with the proceeds of which they go gambling, and generally go round from house to house and help to consume the poor lepers' scanty rations; they have no fixed abode, and are too lazy to work for their own support—in some instances, they even try to obtain the lepers' clothing by some means or other.

For these serious reasons, I venture to recommend to the authorities that they be more strict in the future than they have been in the past years; and, to prevent imposition, let proof be shown of legal marriage before a permit is granted. Moreover, temporary visits which may be allowed to elderly people should be always of the shortest possible period, and the strictest severity should be resorted to in order to prevent any healthy child or young person from entering the Settlement.

THE MORALITY OF THE LEPER SETTLEMENT.

I feel myself obliged to beg leave of Your Excellency to be allowed to speak of a very serious matter, in which I officially appear as one of the principal agents. To avoid criticism I will, with a liberal mind, lay aside as much as possible all difference of creed and opinion, and show how needful a step has been taken for the temporal and eternal welfare of our lepers by drawing a parallel between the past and the present, and between those who yield and do not yield to moral training.

Previous to my arrival here it was acknowledged, and spoken in the public papers as well as in private letters, that the greatest want of the lepers at Kalawao then was not having a ritual leader or priest, the consequence of which was that vice, a general rule, existed instead of virtue, and degradation of the lowest type went ahead as a leader of the community. On the arrival of a new number of lepers, the old ones were soon at work to impress them with the erroneous axiom: "Aole kanawai

ma keia wahi"—in this place there is no law. Not only in private conversation, but in public meetings, I myself heard this doctrine proclaimed; and for a long time, indeed, I was obliged to fight against its application being made to the Divine law as well as to human law. In consequence of this impious theory, the people, mostly all unmarried, or separated on account of the disease, were living promiscuously without distinction of sex, and many an unfortunate woman had to become a prostitute to obtain friends who would take care of her, and the children, when well and strong, were used as servants. When once the disease prostrated them, such women and children were cast out, and had to find some other shelter; sometimes they were laid behind a stone wall and left there to die, and at other times a hired hand would carry them to the hospital. The so-much-praised "aloha" of the natives was entirely lacking here, at least in this respect.

As already mentioned in other pages, the Hawaiian "hula" was organized after the pagan fashion, under the protection of the old deity Laka, who had his numerous altars and sacrifices, and I candidly confess that I had hard work to annihilate Laka's religion and worship, and thereby put a stop to the hula and its bad consequences. Though the people had reached the climax of despair both of soul and body, may it be said to their honor that I found them less addicted to sorcery and the doings of the "kahuna lapaau," or native doctors, than I had found the old natives in Hawaii—circumstances which encouraged me much to stay permanently amongst them, with the quasi certain hope of my ultimate success as a Catholic priest.

By a short digression, I will here speak of another source of immorality, viz., the evil effects of intoxication. I first have to explain how they obtained the material. There grows very abundantly along the foot of the mountains a plant which the natives call "Ki" (*Dracæna terminalis*), the root of which, when cooked, fermented and distilled, gives a highly intoxicating liquid. The process of distilling being very crude and imperfect, produces, naturally enough, a liquor which is totally unfit for drinking. A short time after my arrival the distilling of this horrible liquid was carried on to a great extent. Those natives who fell under the influence of it would forget all decency, and run about in a nude condition, acting as if they were totally mad. The consequences can be easier imagined than written on paper. The local authorities have endeavored to stop all those horrible proceedings, but for a long time they were unsuccessful. It being discovered that certain members of our police were in league with the evil-doers, the "luna nui" and myself went round, and both by threats and persuasion, they finally delivered up their implements which were used for distilling; some of the most guilty perpetrators were convicted, but were pardoned under the condition never to do it again.

For a long time, as above stated, under the influence of this pernicious liquor, they would neglect everything else except the hula, prostitution and drinking. As they had no spiritual advisor, they would hasten along the road of complete ruin. A good many of the sick and prostrated were left lying there to take care of themselves, and several of them died for want of assistance, whilst those who should have given a helping hand were going around seeking enjoyment of the most pernicious and immoral kind.

As there were so many dying people, my priestly duty towards them often gave me the opportunity to visit them at their domiciles, and although my exhortations were especially addressed to the prostrated, often they would fall upon the ears of public sinners, who, little by little, became conscious of the consequences of their wicked lives, and began to reform, and thus with the hope in a merciful Saviour, gave up their bad habits.

Kindness to all, charity to the needy, a sympathizing hand to the sufferers and the dying, in conjunction with a solid religious instruction to my listeners, have been my constant means to introduce moral habits among the lepers. One of the great moral improvements which helped to do away with licentiousness was the granting of inter-marriage licenses between lepers who were not prevented from marriage by a previous marriage tie, and many a couple are to-day living at the Settlement in a decent manner.

I am happy to say that, assisted by the local administration, my labors here, which seemed to be almost in vain at the beginning, have, thanks to a kind Providence, been greatly crowned with success, as, at present, there are very little, if any at all, of the above-mentioned evils committed.

MEDICAL TREATMENT.

Leprosy, from time immemorial up to the present, has always been recognized as an incurable disease. In laying my views before your Excellency, with regard to medicine, I must draw distinction between a developed and an incipient case. In regard to the first, a judicious medical treatment may be followed up, with advantage, to ameliorate the condition of a leper, to alleviate his pains, and to stay somewhat the progress of the disease; but not with the view of obtaining a perfect cure, for such a blessed effect we must look for, and only can hope, in a supernatural gift.

Perchance, in the near future, through the increasing interest and untiring perseverance in the study of the disease, by the most intelligent physicians and scientists, a proper specific for the cure of leprosy may be discovered, which to my knowledge has not yet been found.

In regard to an incipient case, where the disease is not yet developed, there, in my opinion, with proper medicine, good diet,

cleanliness, complete separation from all leprous persons, and other necessary means, taken with perseverance, there only the hope to eradicate the disease from the system, or at least its progress entirely checked, may be entertained. It is now about twenty years since this settlement was established, and this term may be divided in three separate periods.

As I arrived here at the end of the first period, 1866 to 1873, I can only state how I found things at that time. I remember well that the poor people were without any medicines, with the exception of a few physicks, and their own native remedies, from which, I judge, it had been the same from the inauguration of the settlement. It was a common sight to see people going around with fearful ulcers, which, for the want of a few rags, or a piece of lint, and a little salve, were left exposed to dirt, flies and vermin. Not only their sores were neglected, but any one getting a fever, diarrhœa or any other of the numerous ailments that lepers are so often heir to, was carried off for want of some simple medicine.

In the same year of my arrival at the settlement; 1873, there arrived a white man, a leper himself, who had been an assistant to the doctors at the Kalihi hospital. He had quite a practical knowledge of simple medicine, and having been put in charge of our hospital, he especially attended to the patients there, while I, for my part, attended largely to those living outside. Our stock of medicine, the greatest part of which was always supplied by the Board, consisted of the most common necessities. Very soon, the people perceiving that by the use of such simple medicines as we had to dispose of, their troubles were generally greatly ameliorated, and therefore they begun to call more and more for the simple remedies, and thus gradually a perceptible improvement took place. As we had no doctor during this second period, we tried to do the best we could.

During the period of now about eight years, from 1878, we have been under the treatment of four different physicians, to whom the Government has furnished, at great expense, all the different medicines they may have applied for. May I be permitted to direct your Excellency to the annual reports of those intelligent gentlemen, and be excused for not expressing any judgment about their different treatments.

APPENDIX N.

REPORT OF R. W. MEYER,

*Agent of the Board of Health at the Leper Settlement, Molokai,
April, 1886.*

The accompanying report of Mr. Meyer, Agent of the Board of Health at the Leper Settlement, in reference to the Settlement, is very interesting, in so far as it gives a somewhat connected view of the condition of things at the Settlement since its establishment, by one who was connected with it from its inception; but as Mr. Meyer has not been an actual resident, but has lived some ten miles distant, and only paid occasional visits to it, say once a month, he has not had the fullest opportunity to observe the condition of affairs, or to aid in carrying out every reformation that has or might have been carried out, or of accurately noting the various changes that have been made. Therefore Mr. Meyer has not dealt minutely with some of the most interesting events in the history of the Settlement as regards the phases of leper life, such as the Lepart, Walsh or Ragsdale management, when the last named was practically a king among his fellow sufferers, and holding in his will the power of life and death, nor to the labors of the Resident Physicians from the days of Drs. Emerson, Neilson and Fitch, to those of the present active incumbent. Information on these several points will, however, be found more fully set forth in other portions of this general report, and in some instances referred to by the appended foot notes.

REPORT.

To His Excellency WALTER. M. GIBSON,
President of the Board of Health.

DEAR SIR :—In presenting my report of the Leper Settlement for the past two years, I am led to reflect upon the great differ-

once existing in the comforts and ease enjoyed by the lepers at the Settlement of to-day, when compared with the first few years of its establishment, now just twenty years ago. It may, therefore, not be amiss to recite briefly the history of that time, as it shows a constant endeavor on the part of the Government to improve the condition of these unfortunate people, and as I have been connected with the affairs of the Settlement ever since the very commencement (1865-66), I am in a position to speak from personal knowledge. [See Supplement, page 37, and Appendix, page lxxii].

Leprosy had already existed on the Islands for about 20 years before it seriously attracted the attention of the Government, and even then the nature of this disease was poorly understood, and the great magnitude of the calamity was not realized; excepting by a few men of the medical profession, who urged the necessity of segregation, as being the only means known through which this terrible disease had been stamped out in other countries, and it was justly hoped that segregation here would lead to a similar favorable result; and it probably would have done so, had it been possible to rigidly enforce the segregation of lepers, even as late as the time when the law of segregation was enacted (1865) for the known cases of Leprosy on the islands at that time were comparatively few.

The present site of the Settlement, which was established in 1865, was deemed to be the most suitable spot for the isolation of the lepers on the islands, one half of it being bounded by an almost vertical mountain wall, from 1800 to 2000 feet high, and the other by a deep sea, with a precipitous shore, excepting only in two places, one at Kalaupapa, and the other near Kalawao, where in good weather boats can make a landing safely.

The tract of land constituting the Leper Settlement projects from the main body of the island, and forms a kind of shelf, including probably an area of about 5,000 acres, abounding with every variety of soil, and everything necessary to supply the wants of natives (fruits, taro, potatoes and many other vegetables can be grown there to perfection), and leaving a large area of land to be utilised for the raising of stocks; the sea abounds with fish, and before this place was occupied by the lepers, it sustained a very large and thriving population.

Unfortunately the place is not well watered. There is, however, on the eastern boundary of the Settlement a considerable and never failing mountain stream in the valley Waikolu, which is about a mile, or a trifle more, distant from Kalawao. There are other springs in the valley of Kalawao, and one or two in the valley of Waihanau, but all at considerable distances from the habitations. These springs, however, during very dry times are subject to suffer a great diminution of water, and the one at Kalawao, at such times, is liable to dry up. [See Rev. J. Damien's Report, page cxiv.]

It was thought at that time if such a place, as above described, was given to the lepers, where they could live unmolested, they might, with the assistance of some of their families, make comfortable homes for themselves, without incurring much greater expense to the Government than the cost of collecting them together, giving them an outfit of clothing, a few other necessities, and the transport to the Settlement. And such of these unfortunates who were known to be possessed of means, and who had not managed to place them in the hands of friends, in such a way that they could not be got at, had to pay them over to the Government as a reimbursement for expenses incurred in their behalf.

The original inhabitants of the place, owned a great many pieces of land and houses, the houses being mostly thatched ones, and only three or four were wooden structures, the lands were mostly planted with taro, potatoes, and other vegetables. Most of these houses and lands were purchased by the Government for the accommodation of the lepers, and the planted lands for their support.

All the first shipments of lepers were allowed to take their wives and husbands with them, or a son, and in some instances a daughter, but children were not permitted to accompany them.

The Board of Health bought for future use for the Settlement some young heifers, a few horses, one or two pairs of oxen, and a cart for the use of lepers, and they were expected to obtain their living from the growing crops, to take care and re-plant it and live there precisely in the same way as natives do in any settlement on the islands. [See page 42, Supplement.]

Unfortunately, segregations proceeded slowly, and six months or more had elapsed from the time of the vacation of the place to the time of the arrival of the first shipment of lepers, and when they arrived they found the cultivation fields overgrown with weeds, and they had very hard work to save enough to eat for themselves; however, they managed it, commenced to like the place, and got along very well until after considerable intervals one or two more shipments of lepers arrived.

No food was given these people, excepting what the first comers were willing to give them, which was not much; they were willing to work for themselves, but not for others, and the first trouble arose through it. Fortunately, the place was over-run with a native pear, and natives had lived on this fruit previously, and these pears supported them till the Board concluded to furnish these people with food for a sufficient length of time to enable them to raise their own. But their time, with many, never arrived; finding that they got food any way, they made no efforts to work for themselves, and supplies had to be bought. [See page 44, Supplement.] And many really could not work, their hands and feet being too sore. It was also found

that they could not obtain sufficient fish or meat for their support, and they received from the Board small allowances of salt beef or salmon. They were allowed three pounds of meat and one bundle of paiai per week, and nothing else. Some became destitute of clothing, and this was supplied them annually, and only to such as had no means or friends. The men received each a pair of blankets, a denim frock, a pair of pants, a hat, and some of them shoes. The women also a blanket, a shirt of blue or brown cotton, and a calico dress; with this they were expected to get along for a whole year.

For a considerable time there was nobody to look out for these people, a man was sent there just to receive them, show them the houses, and give them their weekly allowances of meat and paiai.

As already stated, water was scarce, and had to be carried considerable distances, and it may be imagined great inconvenience and considerable suffering arose from it.

It was but natural that troubles also arose between them which led to quarrels, and as there was nobody to settle these matters they had to do it themselves the best way they could. Many of them were approaching the latter stages of the disease, and those who had no friends or relatives with them suffered more or less; but I must say, to the credit of these people, that, as a rule, they almost always found a friend in their extremities. There was no hospital or building in those days where they could be taken care of.

It became necessary to appoint a Superintendent, and an elderly gentleman (Mr. Walsh), with his wife, were sent to the Settlement to fill this position. [See page 47, Supplement, 1868.] This gentleman having been an officer in the British army was accustomed to discipline, and he tried his best, and succeeded to a certain extent, to bring some system and order in the affairs of the Settlement. A hospital was erected, the building still standing, and the worst cases were taken there under the immediate care of the Superintendent and his wife. Food was prepared for them, and they got other things, such as a little bread, rice, some tea with sugar, and as by this time the heifers had become cows, there was some milk for them also; thus really for a time considerable suffering from want of attention was relieved. Unfortunately the Superintendent and his wife did not understand the Hawaiian language, and many of his endeavors to establish rule and order were not understood by the people, and constantly little troubles arose between him and the people, and they became as discontented as ever. The poor man fell sick and died, and his widow became Superintendent; as assistant, an old sea captain was sent up, but these two could not agree—neither of them could speak with the people, and matters did not improve; and, in addition to these troubles the

lepers did not receive their full allowance of meat, which was only three pounds per week. It culminated in the discontinuance of the foreign Superintendents, and natives or half-castes were tried, and as experience has proven, with the best results. Natives are perfectly willing to submit to considerable pressure, even oppression, if it comes from one of their own people, but not from a foreigner. [See Supplement, page 58].

It was often difficult to supply the Settlement with food, especially during the winter season, when the landings are bad; an attempt was therefore made to cultivate the valley of Wai-kolu with taro, and manufacture the paiai on the spot. This business was undertaken by agents of King Kamehameha V. in 1870; the valley was leased to them at a yearly rental of \$250, and they agreed to furnish the Settlement at the regular market price. Agents were appointed to prosecute this work, and, I am sorry to relate, that some of these agents, in their anxiety to please the King, took away from the poor lepers all the taro-patches they had cultivated for their own use without the least remuneration. One poor leper alone lost twenty patches; of course this proceeding put a stop to any future cultivation of lands by the lepers and their families. Thus matters continued at the Leper Settlement without material changes till the death of Kamehameha V. (in December, 1872), when, with the ascension to the Throne by Lunalilo, a new Board was appointed.

Segregation was held, by the new Board, to be the only means of arresting the progress of the disease, and the most energetic efforts were made to effect the isolation of lepers, and without regard to person. Lepers were no longer allowed to take their wives or husbands with them, and visits to the Settlement ceased to be permitted, excepting only under the most strenuous circumstances, and only for a brief interview.

The injustice of claiming the means possessed by lepers was at once discontinued; and in the instances where it had been collected, mostly from poor widows, it was refunded to them. The wants of the lepers were considered, and their weekly rations of meat increased, and they were also allowed a greater variety of food, and henceforth received five pounds of meat, or, if they wished, three pounds of salmon per week; also one bundle of paiai containing 21 pounds, or, if they wished, either 10 pounds of rice or 7 pounds of bread or flour, and 5 pounds of salt per month.

A little labor was considered to be beneficial, and even necessary, for the lepers; and, to encourage them to cultivate the lands again, they were allowed the choice to receive the cash value of their weekly supplies of food in lieu of the food itself. This arrangement, subsequent experience has proved to be of great benefit to the lepers as well as to the Board. The lepers managed to cultivate more food than was necessary for their

own use, and, during the winter months, when it was difficult to bring food from the adjacent valleys, there was a supply at hand which was bought from the people at the regular market price; thus many of them obtained means to supply wants which were not filled by the Board. Some accumulated money enough to build houses, and surrounded themselves with other comforts, and all without costing the Board one cent more than it would have done otherwise, and it was really rather a saving.

The difficulty of giving the lepers an annual supply of clothing caused it to be discontinued; and, instead of it, a store was established containing every variety of staple goods, to be sold at less prices, only with sufficient advance to cover the expenses of its management and attendance; and such lepers, instead of receiving clothing, was given a bill to the amount of six dollars, for which he could draw at the store what he wished, and these bills were given out just before the commencement of winter on the 1st of October. This arrangement has not been unprofitable to the Board, and it has been of the greatest comfort to the lepers up to this day, and, in fact, it would be impossible to do without it.

The great bulk of food consumed at the Settlement has chiefly been purchased from the people living in the adjacent valleys of Pelekunu, Wailau, and Halawa, and from there it was mostly brought by the planters to the Settlement in their own boats, subsequently in boats belonging to the Board, and by men hired for that purpose. As already has been said, during the winter season it is at times impossible for boats to land, and food cannot be landed. To meet this difficulty, a stock of provisions—bread, flour, and chiefly rice—has to be kept on hand to be used in such emergencies.

The valley of Waikolu, which forms a part of the Board of Health lands, seemed to offer the means to obviate all the difficulty, and another attempt was made to cultivate the same. A contract was made with the male friends or relatives of the lepers living at the Settlement to cultivate this valley for three years. They were to plant, take care, and prepare the taro, and deliver it to the officers of the Board, and they were to receive as remuneration one half of its market value. (See page 73, Supplement, 1874.) This plan promised to work well in the first and part of the second year; but the people got tired, and when the three years were up they were unwilling to continue the work, and it was given up again.

Besides lepers there existed, and still exists, a large number of people, males and females, who had been allowed to accompany the lepers during former years. Most of these, having no other homes, found the place a very likely one, where they could make an easy living, chiefly obtained from the lepers. To prevent the too great increase of these people, as well as to discourage idle-

ness, the old time-honored Hawaiian rule of "poalima" (fifth day) was established, and which was then in force all over the islands. It simply consists in that every able-bodied male has to give one day's labor per week to the Board, and in turn they were allowed to enjoy the privileges the land affords—precisely the same as the lepers, with the exception, however, that they receive no rations for either food or clothing. To this rule, being accustomed to it, all cheerfully consented, and it has been kept up strictly until recently, but the rule has not been abolished.

A limited number of these people called *kokuas*, or assistants, are absolutely necessary to live at the Settlement for the performance of the work connected with the slaughtering of animals, receiving and distribution of food, preparing food and providing fuel, local police, messengers, etc.; but all those regularly employed are exempt from the *poalima* rule, and, in addition, they receive food rations from the Board.

Hospital accommodations were increased, and bedsteads furnished to the inmates instead of their being compelled to lie on the floor or mats, as heretofore.

Water-pipes were laid on from the spring in the Kalawao gulch to the Hospital, with intermediate taps for the use of the people living all along the road, which relieved them of the great burden of going for the water, and carrying it considerable distances; and they also had more water.

When His Majesty Kalakaua ascended the Throne (in 1873), most of the gentlemen composing the Board of Health under Lunalilo, with the exception of the President, remained in office for some time, and matters continued to go on very much the same way as under Lunalilo.

The number of lepers at the Settlement had increased by this time to about 800, and, in spite of all their efforts to effect their isolation, numbers always remained behind. Want of sufficient means was probable the cause that segregation was enforced only spasmodically.

By this time the biennial Legislatures evinced more interest in the condition of their unfortunate fellow-men at the Settlement than had been the case previously, and at nearly every session a committee was appointed to visit the Settlement and report on their modes of living, sufficiency of food, houses, etc., of the lepers; and, in consequence of one of these visits during the Legislature of 1878, of which committee Your Excellency was chairman, the Settlement received the special attention of the Legislature, which resulted in an increase of their weekly meat rations from five to seven pounds, a number of cottages were also erected, and the lepers received additional necessary articles, such as soap and kerosene oil, and their allowance of 10 lbs. of rice was changed to 9 lbs., with 1 lb. of sugar.

Previous to this, the Settlement had received very little

medical attention, a physician used to come from Maui, two or three times a year, visit the settlement for a few hours, and return. Subsequently, efforts were made to obtain the services of a resident physician, the Legislature having provided an appropriation of \$10,000 for a physician for the Leper Settlement, which has met with varying success.

Unfortunately, the Hawaiians, with few exceptions, prefer their own remedies, and their own doctors; they have little or no faith in a foreign physician; they seem to fear most of them and their medicines, and if left alone, very few avail themselves of their services, excepting in some cases of severe accidents, or when all their own efforts have been unsuccessful, and the case may be well nigh hopeless. [See the reports of Drs. Emerson, Mouritz, and others, on this point.]

By this time, 1886, all the grass-houses at the Settlement have disappeared, and given place to wooden cottages, which are white-washed, inside and outside, twice a year, for which purpose, lime is furnished the people, by the Board, free of expense to them.

There are now, at the present day, according to a recent counting, in all, 327 buildings at the Leper settlement, which include all the hospital buildings, dwelling houses, store, store-houses, and drug-shop, and five places of worship, of which two are Catholic, two Protestant, and one a Mormon church. Of these buildings, 109 belong to the Board, partly purchased, little by little, from the Lepers, but chiefly built on purpose for their accommodation. The rest of the houses are owned by Lepers, built by them at their own expense, and some of them quite handsome ones; they number in all, 213 houses.

Most of these houses are of various sizes, and accommodate various numbers, but they have small rooms, probably more than three or four times the space allowed under ordinary circumstances; all these houses have windows and doors, and thus, as they are but one-storey buildings, they have all the necessary ventilation. There are now many more houses, than existed 8 or 10 years ago, when the number of Lepers reached 800 and upwards, whereas, at the present day, there are but 652. From this alone, it follows, that they are more comfortable, with regard to lodgings, than they have been.

The Leper Settlement with all its houses, neatly white-washed, with its churches and other buildings, its surrounding, imposing scenery, certainly presents a very pleasing and cheerful appearance, especially on fine days, when the population turns out.

The Lepers are allowed to own houses, and they may frequently be seen in large numbers, all dressed up, and enjoying themselves at their heart's content, some few also have carriages, and they may be seen driving; they have, also, a music band, very creditably managed by one of the Lepers. Were it not that these

unfortunates carry the evidence of their misfortune in their faces, it would be impossible to distinguish this settlement from any other of the same size on these islands. It is probably superior to many.

For the lepers who reach the advanced stages of the disease, as well as for those who have no friends, there are now fine buildings, called hospitals; they are wooden structures 46 feet long, by 20 feet wide, and 9 feet high, and for the better ventilation these houses are unceiled and have short chimnies to promote a current of air. There are two rows of bedsteads in these houses at a distance of about 4 feet between each; they are white-washed at least twice a year, inside and outside, and are kept as clean as it can possibly be expected with the means at hand. There the lepers are cared for, their food is prepared for them, they receive tea or coffee with sugar or milk, and some extras when the case demands it. These hospitals are at Kalawao, about 2 miles distant from the landing at Kalaupapa, and surrounded with a picket fence enclosing an area of about 1½ acres. The ground in front of the hospital buildings within this enclosure has latterly been converted into a garden, where the inmates, or those who take an interest in it, plant flowers and some vegetables making the place look cheerful. The hospitals are in charge of a native steward, who, I am happy to say, takes considerable pride in doing his duty well, and to have all the buildings clean, and the wants of the sick attended to. A new cook-house has been built, probably 18 months ago, and whenever I have seen it, it always was clean and tidy, very different from what it used to be. These hospitals are also regularly washed, and there is really now but very little bad odor compared with former years, when the means of obtaining a sufficiency of water were difficult. The clothing of the inmates are washed by people employed for that purpose. But in spite of the care taken to make these people comfortable, very few care to go into the hospitals, they do not seem to feel at home there, and the buildings are seldom more than very partially filled; at present there are only 43 inmates; 36 of them are males, and 7 females.

Besides these hospitals there are two other buildings, one for boys and another for girls, which are in charge of Father Damien, and on this account they are in the immediate proximity of his own dwelling-house. These houses are intended for the reception of orphans or children who have neither parents nor friends at the Settlement.

Other children at the Settlement live with their parents, or relatives, in the same manner as they do in other places. There are two schools for them, one at Kalaupapa, the other at Kalawao; the former has a *kokua*, not a leper, for a teacher, the latter, a leper. The leprous and non-leprous children go into the same school, but are kept in separate places in each of these schools.

The number of scholars in all are 50, of whom 36 are boys and 14 are girls.

Some important improvements have been made during the period now ending. In the center of the Kalaupapa boat harbor were rocks on which, in years past, many a boat was wrecked, and much valuable material lost in consequence. The President of the Board sent Mr. Van Giesen who removed these rocks, and the landing is now comparatively safe to what it used to be in former years. Quite an extensive wharf, or boat-landing, has also been built, facilitating the discharge of freight and landing of passengers to a considerable extent.

A large and spacious store-house has been placed right at Kalaupapa landing, which was very much needed there; one end of this house is set apart for a drug-store and doctor's office for the benefit of that part of the population living at and near Kalaupapa. For this purpose a house has been removed from Makaanalua, about a mile or a little more from Kalaupapa. This house was originally intended to entertain the visitors to the leper Settlement, in order to prevent their mixing with the lepers, but experience has proved the inexpediency of this measure and the house has never been used for that purpose. At Iliopi near the Kalaupapa landing is a well, where most of the people living there obtain their water supply, and over this well a neat little structure has been erected and a pump put in the well. This little structure adds much to the pleasing looks of the place besides affording a resting place and shelter for those coming for water. At Kalawao a new and comfortable dwelling-house has been built designed for the occupancy of a resident physician. The drug-store at that place has been removed a little distance off nearer the hospitals, and is now in a better place than it was before. [See Dr. Mouritz's report, appendix "L."]

A new cook-house has been built within the hospital yard, in place of the old one, which was too small and could not be kept sufficiently clean.

A small reservoir has been built near the hospital, for the purpose of having on hand a supply of water in case of accident, or repairs of the pipes.

The Kalawao water supply has been much improved in taking up about a couple of thousand feet of the old small pipes at the spring and replacing them with much larger ones, thereby allowing the old pipes to be utilized for a further extension of the pipes, and to provide the new slaughter-house, when built, with the necessary water,

The food supply during the last two years, with the exception of the first few months, has been very regular, and since about 8 months, at a somewhat reduced rate in price. Partly owing to the greater abundance of taro, and partly to the better modes of transportation, instead of bringing the supplies in boats as

former years it has been brought per steamer; and there has also been less bad weather during the winter to prevent landing.

The meat supply, also, has been much better, and the lepers have received chiefly beef and mutton, and salmon, only as a change during a very few instances, when a supply of stock did not arrive in time.

Each leper has received the rations as already stated, but since April 1st, of last year, the allowance of cash, in lieu of food, has been discontinued, and all have since that time received their rations in food. On the occasion of a visit to the Settlement by Your Excellency, as President of the Board of Health, in response to a petition from the lepers, the bread and flour rations have been supplemented with one pound of sugar, so that each leper now receives 7 pounds of bread or flour with one pound of sugar, and this makes the bread or flour rations about equal in value with the price of a bundle of pai-ai. Each leper, therefore, receives now, per week, as follows:

Either 7 pounds of mutton or beef, or 3 pounds of salmon, or fresh fish when it is to be had; either one bundle of pai-ai—21 pounds—or 9 pounds of rice with 1 pound of sugar; or 7 pounds of bread with 1 pound of sugar; or 7 pounds of flour with 1 pound of sugar; and per month; half a bar of soap and 5 pounds of salt. And to each house, or each family, or company living by themselves, one quart of kerosene oil is given per month for illuminating purposes.

On the 1st April, 1884, there were living at the Settlement, as per weekly reports 754 lepers
Arrived from Honolulu since that time to date 137 "
Kokuas, or friends living with the lepers, have contracted the disease as per declaration of the visiting physicians 52 "

Making the total number 943 "

Of these have died, or been discharged :

Deaths 259 "

Discharged 32 "

291 "

Leaving the total number now alive at the Settlement

April 1st, 1886 (or supposed to be lepers) 652 "

Of these—607 are native Hawaiians, 19 half-caste Hawaiians, 19 Chinamen, and 7 white foreigners.

Besides the lepers, there are a number of kokuas, employed by the Board, who also draw rations of food only; and all children born at the Settlement from leper parents, whether they are already lepers or not, and a few cases of very old people who likewise receive rations of food for charitable reasons.

CXXXV

The average number of kokuas, including Father Damien and Rev. J. Kahanaloa, are about 25, old people 3, and children about 4; very young children receive half rations, or their mothers for them.

The total amount of meat and food, and other articles of necessity consumed by the lepers during these two years past is as follows:

100,801	pounds of rice
9,036	" of flour
40,769	" of bread
42,272	bundles of pai-ai, of 21 pounds each
24,450	pounds of potatoes
16,351	" of sugar
1,048	head of cattle, or 380,723 pounds of beef
2,522	" of sheep, or 81,288 pounds of mutton
26,660	pounds of salmon
2,110	gallons of kerosene oil
9,052	bars of soap
112,920	pounds of salt
	Cash in lieu of food to April 1st, 1885, 12,326 pounds
	weekly rations, \$6,033 60
150	pounds of coffee
27	" of tea
13	dozen yeast-powders.

And I must mention that bakers' bread, and tea and coffee, are only given to the inmates of the hospitals, and the greater portion of the milk obtained from the milch cows at the Settlement.

Segregation of sexes has only been attempted within the hospital yard, where the women occupy separate houses from the men, and with the children, living in the two houses in charge of Father Damien.

The condition and behavior of married people at the Settlement appear to me to compare very favorably with other places, and I do not believe that their standard of morality falls below, if any, that of people living in other settlements. Everything is done to provide for married people—either separate houses or rooms, as far as the means at hand allow this to be done.

The lepers do not directly receive clothing from the Board, but they receive an order to the value of six dollars annually, for which they receive at the store whatever articles they stand in need of; but I must say that, as they now have no means of earning any money, that those who have no friends to assist them cannot clothe themselves sufficiently for six dollars per annum, and there would be more or less suffering were it not that charitably-disposed people, especially from the people of Hono-

lulu have occasionally sent—such as the contributions of clothing, etc., collected by Her Majesty the Queen—these unfortunates presents of clothing, which supplied the wants of the needy ones.

Friends and relatives of lepers living on the other islands are permitted to visit the Settlement and live with the lepers for a shorter or longer time, from one week to a month or more, provided, however, that they produce a permit, as required by law.

For the preservation of law and order, a magistrate has been appointed, who, although vested with the authority of a district judge, uses his office chiefly as a judge of peace, or peace arbitrator. All difficulties and disputes arising between the lepers are settled in a friendly manner, without expense to either party, and apparently to the satisfaction of all.

With the exception of the one unfortunate case of manslaughter, committed at the Settlement in November last, crimes have been of rare occurrence. Since 1882 there has been but one case of burglary, and during the last two years only one case of attempted burglary. For such crimes, of course, the offenders are punished with imprisonment; but, being sick, the time of imprisonment is made very much shorter than the law really prescribes.

As laws and rules which cannot be enforced had better not be made, it has ever been the endeavor of those having had charge of the affairs of the Settlement to establish as few of them as possible, and only such which years of observation and public opinion at the Settlement made and approved. These rules, therefore, are few, but the following of them have been the means of preserving the peace.

Each leper has the right to select a building spot wherever he pleases, provided the place is not essential for purposes of the Board of Health, and he is therefore required to notify the superintendent. Each leper on arrival at the Settlement has also the right to select the family or company he desires to live with, provided, however, they do not object to it. If they object, he is given a place with others who are not adverse to it.

Lepers building houses at their own expense, have the right to sell those houses again to other lepers, for lepers to live in. All houses built by lepers at their own expense, therefore owned by them, are, nevertheless, considered to be under the control of the Board, if to assert such a control, for good reasons, should become necessary.

Lepers trusting one another with money or other things, must do so at their own risk, nothing is done for them, officially, by any officer of the Board.

Claims against deceased lepers for services rendered during

their last illness are respected, if testified to by the leper before death and in presence of the chief officer of the Settlement; and if his heirs do not pay the disputed amount, his property, if he leaves any, is sold and sufficient of the proceeds is paid for such services.

The property of a leper who dies without heirs at the Settlement or assigns, is sold by the sheriff of the Board and the proceeds are forwarded to the President of the Board of Health, and the death of the leper is advertised in the papers that his heirs may come forward and claim what he left. Wills left by lepers are also carried out by the Board, provided they are satisfactorily made out and properly witnessed.

Drinking intoxicating beverages is forbidden, and persons found drunk are punished with 24 hours imprisonment.

Making intoxicating drink from potatoes or ti root is likewise prohibited and punished, and all material used in making the same is confiscated and destroyed.

Liquor for the use of lepers and kokuas is not allowed to enter the Settlement, and suspicious looking packages when they come ashore are opened. If liquor is found, it is confiscated and destroyed, or sent to Honolulu to the Marshal, to whom opium, if found, is also sent.

Gambling is also forbidden at the Settlement, and guilty persons are punished.

For the kokuas, the same rules are applied with some additional ones.

Every able-bodied male kokua is to give one days' labor to the Board, per week, for which he enjoys all the privileges and benefits of the place.

Kokuas deserting their leprous wives, or husbands, on whose account they were permitted to live at the Settlement, are told to leave.

Kokuas repeatedly guilty of disorderly conduct, or gross immorality, are likewise ordered to go.

Every kokua can leave the Settlement when he pleases, but he cannot return without a special permit from the President of the Board of Health.

Kokuas, guilty of crimes or misdemeanors, are tried according to the laws of the Kingdom.

These are, substantially, all the rules, which have, thus far, been observed at the Settlement, and with the exception of the unfortunate occurrence last November, already mentioned, affairs have gone very smoothly during the past period.

During the past twelve or fifteen months, the lepers have had a much better opportunity to avail themselves of medical attendance, than they have ever had before, having had the ser-

vices of a resident physician during the greater portion of this time.

The live stock now running on the pastures belonging to the leper Settlement, consists in 235 horses, 288 mares and 74 colts; in all, 597 horses; 40 cows, 18 steers, 25 heifers, 10 working-oxen, 1 bull and 25 calves; in all, 119 cattle; 20 jackasses and 3 mules; in all, 23; making a total of animals of 739 head; now running on the land.

Suggestions for further improvement of the condition of the lepers and additional comforts, I have but few to make.

Since the discontinuance of allowing lepers the choice of receiving the cash value, in lieu of their weekly food rations, many of them have become rather poor; they do not plant as much as they used to, as they cannot sell their produce, it ceases, with them, to be an object to raise it.

I beg, therefore, to recommend the re-establishment of the system of giving them the choice to receive either the food itself or cash in lieu thereof, besides providing means as much as possible to enable them to earn a little money, such as by raising potatoes and purchasing them again, as used to be done for the supply of the hospital, and others who very often prefer them to *pai-ai*, rice or bread. They will then be able to supply themselves with some additional clothing and other necessities, for, as already said, "six dollars per annum is insufficient to clothe anybody for 12 months. It does not cost any more to give them cash in the line of food, rather the contrary, and were it only practicable to adopt the plan of giving them *all* cash in lieu of food and meat, it would very much simplify the management of the place, and be less expensive.

Whilst I do not wish to deny the desirability of laying a larger water-pipe, and extending the same to Kalaupapa, I must say that no absolute necessity for it exists, but should means be at hand and permit it to be done, I would recommend that it be done. And in that case, I would still advise obtaining the water from an abundant and unfailing source, by which Kalaupapa, Makenalua and Kalaupapa, and the entire Settlement, can be supplied at once, for almost any desired purpose, then to obtain the supply from springs which are too much dependent on our irregular and uncertain rainy season, even should it cost a little more.

I would also recommend the erection of a new slaughter-house, the present one is getting old and in a place where it is difficult to be kept clean, and put in a place where it can be supplied with water from the pipes, and save the expense of carting the same.

Furthermore, I consider it an advantage, when providing the

Settlement with beef-cattle, to obtain a larger number at once, sufficient, perhaps, to last three months, that they may derive some benefit from the extensive pastures.

As a rule, cattle lose in weight for the first two weeks after being landed, owing to change of place and pasture, but will soon regain what they have lost, and probably add considerably to their weight.

To the request, what my experience and observations during these years of my intercourse with lepers and others, have taught me, relating to the contagiousness or uncontagiousness, heredity and causation of leprosy, I will give the result which may be taken for what it is worth.

In the face of so much evidence of its spreading in so short a time as it has done on these islands, it is hard to conceive how anybody, professional or non-professional, can doubt the communicability of leprosy. It is simply the extreme slowness of its action and development, the apparent immunity from it, which so many seem to possess, and the imperceptible manner of its communication, which could have led to the conclusion that the disease is not contagious.

I arrived on these islands in 1850, and very little, if anything was then known of leprosy; about the year 1857, I first heard of its appearance amongst natives, under the name of Chinese disease, or in Hawaiian, "Mai Pake." It was recognized by the few Chinese, then on the islands, and this has given it the name of "Mai Pake" here, and not because it has been introduced here by the Chinese. It is much more likely that it came to these islands through the mixed crews of whale-ships, which had negroes, black and white Portuguese, and men of other races, coming from countries where leprosy was, and still is, prevalent.

In about 1859 or 1860, I saw on this island the first case of leprosy, it was a young man, he died with it in less than three years. The young man's mother took care of him, and, probably, in 1868, she showed signs of leprosy, and died a leper at the leper Settlement. I have known these people well, for they lived in my neighborhood. I only mention this one case, although I have account of others. And at the leper Settlement, whilst there are many cases where people have lived together for many years, without showing visible signs of leprosy at present, there are enough who do, and as I reported before, 52 kokuas alone, have become lepers during the past two years, or declared to be lepers, by the physicians attending. Again, a number of foreigners of various nations, American, English and German have become lepers.

Is it reasonable to suppose that all these men would have

become lepers, had they remained at home where they were born? They became lepers, because they came here, to a place where leprosy was prevalent, and exposed themselves to it.

Leprosy attacks the robust as well as the delicate, but it appears that people with syphilitic and broken-down constitutions are more apt to become its victims. That, no more foreigners have contracted the disease than they have, is simply owing to their better mode of living and care they take, to avoid coming in contact with leprosy, and it may be that they possess a greater degree of immunity.

The disease appears to me also to be hereditary, and I will give a short history of a couple, a man and his wife, living also in my vicinity. Both man and wife are strong and hearty looking people, they show no outward signs of the disease, yet their children at the age of 6 or 7 years became lepers one after the other, several of them were taken to the Settlement years ago, and there died lepers, and they have now with them another child, also a leper. How did these children become lepers? The husband's mother died a leper, the wife's father likewise. Is here not reasonable belief that these children were born with the germ of the disease in them, and that it was transmitted to them through their grand-parents? Similar cases exist or have existed at the leper Settlement. Another significant fact is the great number of cases of leprosy existing, where other and older members of the family of such cases are lepers or have died with it.

The cause of the disease appears to me to be more or less speculative, but taking a general view and comparing the same with other diseases, it is not improbable that leprosy is caused very much in the same manner as they are. If it be true that like causes, under like circumstances or conditions, always produce the same effect, or similar causes similar effect, it must be evident that all diseases, running a known course, from that visible beginning to the end, must have had always the same origin, each disease peculiar to its kind, very much like the sprouting and growing of seeds of different plants.

What this origin of leprosy or other disease consists in I do not pretend to know, it may be a parasite or organism of an inconceivably small size, which enters the body, and under unknown conditions develops and reproduces itself until it has taken possession of every part of the body including the organs of reproduction.

Until the true cause of the origin of leprosy has been discovered, there does not appear to me to be much hope of arresting the progress of the disease or effecting a cure, and no other means can be expected to stem the spread of this scourge, than

the most merciless and rigid enforcement of the law of segregation. It would prove to be the most merciful in the end. Twenty years of segregation have now been practised. What is the result? there are as many lepers as ever, more than in the commencement.

Halfway measures are here of no avail, they simply amount to a constant repetition of those heart-rending scenes, experienced by so many, of separating husbands from wives, parents from children, brothers from sisters, and without accomplishing the important purpose of saving the rest of their fellow-men, and for which they were required to suffer, and willingly gave up their liberty.

I am fully aware of the insuperable difficulties encountered in carrying out the law of segregation on these islands, and therefore doubt the possibility of having it carried out to the extent it ought to be.

There is, however, one hopeful sign, the disease appears to assume a milder form, and the number of the very bad cases, of which there were so many in former years, is very much smaller and the disease appears to progress slower.

I have the honor to be, sir,

Your obedient servant,

R. W. MEYER,

Agent Board of Health.

APPENDIX P.

REPORT OF DR. E. COOK WEBB ON THE BRANCH HOSPITAL AT KAKAAKO.

HONOLULU, March 1, 1886.

His Excellency WALTER M. GIBSON,
President Board of Health.

DEAR SIR:—I have the honor to submit for your consideration my report for the portion of the biennial period that I have had charge of the Branch Hospital at Kakaako. As regards the treatment of leprosy I have but little to say. Notwithstanding any treatment which I have used, or seen used, I cannot see any change in any single case. I am fully convinced, after considerable study and experience, that personal cleanliness, good, nourishing food, and regular habits, have done more towards the relief of these unfortunates than all the medicine that has ever been prescribed for them in the past. Many patients, on coming into the hospital in a weak and exhausted condition, after a short time show manifest signs of improvement, and continue to improve for a considerable length of time without any treatment whatever. I do not wish to be understood as saying that they do not require treatment for other diseases than leprosy, for they are more subject to certain ailments than others that are perfectly amenable to treatment. In all the cases of leprosy I have seen, the disease has steadily progressed to a fatal termination, notwithstanding all treatment. I am aware that I am taking strong grounds against the many so-called "cures" that have been devised, but, in so doing, I am not basing my opinion on my own study and experience alone, but on the opinion of those who for years have been in daily contact with the disease, and have made it a special study, and they have come to the conclusion that it is a disease "*sui generis*" and "incurable." So much has been said and written on the subject of the contagiousness of leprosy that I cannot allow the opportunity to pass without putting myself on record.

I have not formed a hasty opinion, neither is it based on facts gleaned alone in these islands; but I shall deal alone

with these islands to produce what I believe to be strong points against the theory of contagion. Were it as contagious as many physicians have stated it to be, more than one-third of the foreign population of these islands would have become lepers long ere this. Before the medical profession, and many of the laity, became as familiar with the disease as they now are, there were numbers of foreigners who had lepers in their employ who were more or less affected. These servants performed all the domestic duties that are performed by domestic servants to-day—cooking, washing, etc. Notwithstanding this well-established fact, it is perfectly apparent to the ordinary observer that the percentage of leprosy among foreigners is, and always has been, remarkably small. I have had it from several of the older residents that in times past they have seen spots and eruptions on the bodies of some of their servants that they now know was leprosy—and they know that some of them have since died at Molokai.

There is a vast amount of unwritten history of leprosy in these islands that, were it placed before the people, with the names of those who are familiar with all the facts, would almost entirely do away with the bugbear of contagion. Family and social considerations prevent these people from giving their statements to the public as they would to a physician, whom they think is honestly seeking for facts for his own professional benefit. Within the past two or three years there has been a great amount of feeling among foreigners in regard to the rapid increase and spread of the disease, and this idea has been kept constantly before them either for reason of personal aggrandizement, or a desire to show that the Government were at fault in not doing as each individual thinks it should. The fact is, it is no more on the increase to-day than it was two years ago. There must necessarily be a number of new cases occurring from hereditary transmission, but the number is no greater than it was years ago, when less was said and written. There is no more danger of foreigners, who do not bring themselves into the most intimate possible contact with a leper, contracting the disease than that they should contract consumption from shaking hands with a person afflicted with that disease. The fact of a foreigner showing symptoms of the disease in the past has found sufficient grounds for the statement that "it was spreading rapidly," etc. I am aware that there are, and have been, foreigners who have for a greater or less time concealed the fact that they had the disease; but I am not aware that any of them have pretended to have always led here a "sober, upright, and righteous" life. This must be evident to the older residents here, as they have seen the disease almost

from its first discovery in these islands 'confine itself to those who have been at some time or other on the most intimate terms with the native population, who have been liable at all times to the disease. I have carefully investigated many of these cases, and in no single instance can I find that it was contracted by ordinary intercourse. I do not propose to make an invidious distinction in any case, but I do say that there is not the slightest possible cause for alarm on the part of either Hawaiian or foreigner who does not, or has not, held the most intimate possible relations with a leper.

As to the cause of the disease I am as much in the dark as those who have made it a special study for the past one hundred years. But I am sure that syphilis has nothing whatever to do with it, except as a complication. The strongest possible testimony can be adduced in support of this statement, both here and elsewhere, but I will cite cases in these islands that I think offer strong support to the statement. There are numbers of foreigners now residing here and who have been constant residents for the last forty years, who, almost on their arrival, contracted syphilis from native women, and passed through the different stages of that disease, and yet in no single instance, and I am familiar with several, have they as yet developed the slightest symptom of leprosy. Why should these people possess an immunity from leprosy if syphilis is either directly or indirectly the cause of it? But, says one physician, "we know nothing of the period of incubation." I will admit the statement, but at the same time I say there is little to fear from any disease that will not develop itself until twenty years after exposure. I am impressed with the idea that it develops much sooner in some than it does in others. Habit, mode of living, peculiarities of temperament, etc., play a prominent part, but I do not believe it takes twenty years in any case. So much has been said and written in the United States, in particular, in reference to the contagiousness and spread of the disease in these islands, that their interests have been affected by it, and some foreigners who would gladly visit here now believe that they would most surely return home to become lepers sooner or later. When there is such strong evidence obtainable from all parts of the world where the disease exists, against its contagiousness, I think this Government should take measures to spread such evidence broadcast over the land.

From the testimony of numerous navy surgeons who have visited Kakaako, there is no country in the world where leprosy exists, where those afflicted are so well cared for as they are here. This is undoubtedly a fact, as anyone who visits the Branch Hospital can see, and this Government can well be

proud of it. All its surroundings are as neat and orderly as any hospital can be, and one would hardly suppose, without investigation, that it was the abode of leprosy. There is very little evidence of suffering, and among the younger patients, could anyone see them at play, they would never suppose they were looking upon that hideous disease, leprosy. They all seem happy and contented, and it is but rarely that any complaint is heard.

* * * * *

Your Excellency,

I have the honor to be

Your most obedient servant,

E. COOK WEBB, M. D.
Physician to Branch Hospital.

TABLE I.
THE BRANCH HOSPITAL, KAKAOKO, OAHU.

QUARTER ENDING.	1884.				1885.				1886.		1882-84.
	JUNE.	SEPT.	DEC.		MARCH.	JUNE.	SEPT.	DEC.	MARCH.	TOTAL.	
Patients admitted, males.....	24	13	7		12	7	8	1	2	74	333
Patients admitted, females.....	17	9	5		6	4	2	6	2	51	198
Patients died, males.....	4	4	3		3	1	1	1	4	21	26
Patients died, females.....	5	2	1		1			1	2	12	12
Patients born, males.....											
Patients born, females.....	1										
Patients sent to Molokai, males.....	13	11	8		26	2	22			1	235
Patients sent to Molokai, females.....	10	8	6		10		6			83	130
Patients discharged, males.....	4	4	12		11	4	2		3	40	41
Patients discharged, females.....	4	1	9		10	2	3	3	1	33	25
Patients returned, males.....	12	1				1	1			15	19
Patients returned, females.....	4									8	9
Patients at hospital, males.....	134	119	104		76	76	60	60	55	55	104
Patients at hospital, females.....	72	70	60		45	50	44	46	45	64	64
Patients under 12 years, males.....		16	16		14	13	16	16			29
Patients under 12 years, females.....		15	14		12	13	12	16			16
Patients from 12 to 45 years, males.....		93	82		79	56	57	88			211
Patients from 12 to 45 years, females.....		59	46		41	32	29	26			147
Patients over 45 years, males.....		27	26		22	12	11	11			93
Patients over 45 years, females.....		8	12		11	8	8	7			36

The patients included 2 Americans, 1 Irish, 1 German, 2 Portuguese, 6 Chinese, 2 South Sea Islanders, 2 Spaniards and 1 Pole.

TABLE II.
DEATHS AT THE BRANCH HOSPITAL—SEX, AGE AND CAUSE.

NAME.	SEX.	AGE.	IN HOSPITAL.	CAUSE OF DEATH.
Haman.....	Male	35	2 yrs 1 month	Peritonitis.
Halei.....	Male	16	1 year 4 months	Heart disease.
Susan Pahiwa.....	Female	25	1 year 27 days	Exhaustion.
Koholakahiki.....	Male	52	1 year 1 month	Leprosy.
Kaliha.....	Female	15	200 days	Consumption.
Kaimoku.....	Female	17	6 months 20 days	Consumption.
Akula.....	Male	33	5 months 16 days	Leprosy.
Makiwa.....	Female	39	3 days	Exhaustion.
Kenah.....	Female	43 days	43 days	Diarrhea.
Kirua.....	Female	25	3 years 7 months	Tuberculosis.
Mahiai.....	Female	65	3 years 6 months	Leprosy.
Milekioio.....	Female	13	1 year 5 months	Pneumonia.
Kanaka.....	Male	67	4 months 8 days	Leprosy, chronic pneumonia.
Kahohinu.....	Male	53	2 months	Hemiplegia apoplexy.
Kini.....	Female	22	1 year	Leprosy, gangrene.
Kekui.....	Male	25	11 months	Exhaustion.
Kealane.....	Male	38	11 months	Pyemia.
Kapuni.....	Male	31	1 year 2 months	Exhaustion.
Kaholo.....	Male	35	4 years 2 months	Leprosy nephritis.
Pua.....	Male	18	1 year 9 months	Consumption.
Halehuamano.....	Female	11	1 year	Exhaustion.
Joe Kukuma.....	Male	24	10 months	Exhaustion.
Kaukal.....	Male	33	6 months	Leprosy phthisis.
Ekeke.....	Female	11	2 years 10 months	Visceral leprosy.
Thomas Birch.....	Male	50	3 years 4 months	Leprous diarrhoea.
D. Quinn.....	Male	64	5 months 9 days	Gangrene.
Mokuai.....	Male	32	1 year 5 months	Exhaustion.
Wehelohani.....	Male	16	1 year	Phthisis pulmonalis.
Kalua.....	Male	7	8 months	Tuberculosis.
Puulene.....	Male	44	3 years 6 months	Leprosy exhaustion.
Kauanui.....	Female	22	2 years 1 month.	Phthisis pulmonalis.
Polly Tolman.....	Female	50	3 years	Leprosy exhaustion.
Kanui.....	Male	52	4 years	Pyemia.

Total number of deaths from April 1, 1894, to March 31, 1896, 33.

TABLE III.

MORTALITY OF CHILDREN OF LEPERS.

Out of 170 lepers recorded, at Kakaako, 93 of these had 385 children, of whom, at the date of the record (1883), 217 were dead and 168 living. The following table shows the results in the largest families.

Name.	Age.	Born.	Living.	Dead.
Kalia (m)	66	17	11	6
Kaaea (f)	40	15	7	8
Joane Paele (m)	40	13	3	10
Kauia (m)	40	12	5	7
Kamahaluou (m)	43	12	3	9
Kalawahinui (f)	54	12	3	9
Kauwi (m)	36	11	7	4
Makahunalowa (m)	41	11	5	6
Kalakoa (m)	59	10	2	8
Oiliokalani (m)	60	10	5	5
Ulukou (m)	61	9	3	6
Kalua (f)	36	9	5	4
Take (f)	46	9	8	1
Dan. Pale (m)	43	8	6	2
Kailipalua (f)	37	8	5	3
Sam. Kameahakau (m)	45	8	0	8
Nakiele (m)	53	7	0	7
Kauhaunaele (m)	34	7	2	5
Totals		188	80	108

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SUMMARY.

CAUSES OF DEATH.	Adult.—		Children under 12.	
	Male.	Female.	Male.	Female.
Apoplexy	1	0	0	0
Consumption	1	2	0	0
Diarrhœa	1	0	0	1
Heart disease	1	0	0	0
Leprosy	3	1	1	0
Leprous gangre	1	0	0	1
Leprosy nephritis	1	0	0	0
Leprosy phthisis	1	0	0	0
Old age, exhaustion	5	3	0	1
Peritonitis	1	0	0	0
Phthisis pulmonalis ..	1	1	0	0
Pneumonia	1	0	0	1
Pyæmia	2	0	0	0
Visceral leprosy	0	0	0	1
Total	20	7	1	5

APPENDIX W.

REPORTS FROM DISTRICT PHYSICIANS ON LEPROSY IN THEIR DISTRICTS.

DR. J. H. KIMBALL, HILO DISTRICT, HAWAII.

Dr. Kimball reports 8 cases of leprosy and one suspect. One is a Prussian, and the remainder, Hawaiians; eight males and one female. They include a mother and her two children, and the nephew of a man who died from leprosy. The treatment adopted is Potass., Iodid., Sal. Soda, Fowler's Sol., alternate. Disease in abeyance.

The Prussian has been under treatment more than three years, and shows slight signs of improvement.

Dr. Kimball remarks that the disease is on the decrease in his district; that he has seen no cases in which opium has been known to have been used, and that alcoholic drinks have no perceptible effect on the disease.

He remarks that "owing to the fact that Hawaiians cannot be depended upon to follow directions for any considerable length of time, the treatment of them, in their homes, for any chronic disease is very unsatisfactory."

DR. RICHARD OLIVER, KAU DISTRICT, HAWAII.

Dr. Oliver reports one case of leprosy and three suspects in his district, all single, and Hawaiians, and without any leprosy relatives. Three are females and one male. The treatment adopted is Arsenic and Iodide Potass.

Doctor Oliver remarks that the disease is stationary in his district, and that in former years he found that alcoholic drinks had a decidedly prejudicial effect on both forms of leprosy; of the effect of opium, he cannot speak.

DR. L. S. THOMPSON, DISTRICT OF KOHALA, HAWAII.

Dr. Thompson reports 11 lepers and 5 suspects. Seven married lepers have 15 children, 8 boys and 7 girls. There are 8

males and 8 females, and only 1, a suspect, is credited with a leprous relative, a brother. The treatment adopted is Fowler's solution of Arsenic. and Salicylic acid and Arsenic.

The disease is believed to be on the decrease in this district.

DR. BROOKES O. BAKER, DISTRICT OF NORTH AND SOUTH KONA, HAWAII.

Dr. Baker reports 4 lepers, all natives, 2 males and 2 females, 2 married, with 3 children, and 2 single. The father of 1 of the married females was a leper.

The method of treatment adopted is to give as varied a diet as one can get, and liq. Pot. Arsen., Salicylic acid, Iron, Quinine, etc.

DR. R. KUEHN, DISTRICT OF LAHAINA, MAUI.

Dr. Kuehn reports 14 cases of leprosy, 10 males and 4 females, and all Hawaiians. Two are married, one a widower, and they have four children. Except in the cases of the two married ones, all have leprous relatives, father, son, brother, nephews and cousins.

Treatment; Potassium, Iodid. treatment, and Pot. Iodide and Hydrargyrum. Results not good.

DR. F. B. SUTLIFF, DISTRICT OF WAILUKU, MAUI.

Dr. Sutliff reports 17 lepers and 6 suspected lepers in his district, 11 males and 12 females, all Hawaiians, 7 married and 16 single. Five have relations who are lepers. Nine are under treatment by four different doctors. Dr. Sutliff states that in one case treated by him, Arsenic has seemed to arrest the disease somewhat. So far as he can judge the disease is on the decrease.

DR. CAMPBELL, DISTRICT OF HANAIEI, KAUAI.

Dr. Campbell reports thirteen lepers—8 males, 5 females—all Hawaiians; and ten married, with nineteen children from ten families. In three cases the father of the leper was a leper; in another, the son; and in another, the first husband and two children.

In regard to treatment, Dr. Campbell says:

"Constitutional: Tonics, especially nervine, I have found to answer best. Caution to live regularly, avoiding excesses of all

kinds. Potassium iodide does well in some cases, but in others it does no good.

"Local: Iodoform ointment, 1-10, I have found best for the treatment of open sores. It is anti-septic, deodorizing, and slightly stimulating. I caution my patients to protect the anæsthetic parts of their limbs, as injuries unfelt by the patients are responsible for the sloughing of some parts. In some cases I have recommended the douche and shampooing as aids in maintaining the vitality of parts."

Dr. Campbell thinks that leprosy is stationary in the district, and that "the only way to cope with the disease is to segregate the affected part of the population, not because of the contagiousness of the disease, for that is a fact which has not been satisfactorily proved; but from the fact that the disease is admittedly hereditary; and by so segregating the leprosy members of a community, prevent the procreation of bad stock, at least in healthy localities."

DR. ST. DAVID GYNLAIS WALTERS, LIHUE DISTRICT, KAUAI.

Dr. Walters reports two cases of leprosy and one suspect, all Hawaiians and males, and without leprosy relatives. He considers "the condition of leprosy here as being in a most satisfactory condition," or, as stated in another section, "the condition of leprosy in the Lihue district must be regarded as very satisfactory." "I am perfectly satisfied, from my own experience, that it would be perfectly useless to attempt the treatment of native lepers at their own homes, because as soon as they are satisfied that they have acquired the disease they either hide themselves in remote corners of the woods, or place themselves under the care of kahunas, even though they profess to be following out the line of treatment laid down for them by the Government physicians."

DR. JOHN BORLAND, DISTRICT OF WAIMEA, KAUAI.

Dr. Borland reports seven lepers, all Hawaiians, and single—4 males and 3 females. Four of them acknowledge having leprosy relatives. Six of them are under treatment with hydrophosphites, with iron and strychnine, and electricity or hydrophosphites with arsenic and electricity. A Chinaman, not under treatment, is reported as a suspected leper.

Dr. Borland thinks that leprosy is on the increase, and remarks: "I have encountered so many difficulties in dealing

with those affected, as owing to the prevailing opinion among the natives, that immediately on presenting themselves for treatment they will be sent off to Molokai. It is within my knowledge that this opinion exists extensively, thus preventing a number who would benefit by suitable treatment from seeking advice. This leads me to state that I am of opinion that the suggested hospital at Hanapipi would not only be desirable, but beneficial, as suitable treatment and close observation would be obtained; and, from the authority of the donors of the site, and from the suitability of the site, isolation satisfactory could be obtained."

DR. G. W. PARKER, WAIALUA DISTRICT, OAHU.

Dr. Parker reports three lepers—2 males and 1 female; and ten suspects—6 males and 4 females. Eight had thirty-five children. The mothers of two of the boy suspects had eleven; all dead except these boys; and another subject had ten, of whom eight are alive.

Dr. Parker states that he believes the disease is on the decrease. He says: "I only know of three or four really leprous persons in the whole district, even when all suspects were collected for this examination by the police. There are no Chinese lepers in the Waialua district. As a drug, opium has no specially beneficial effect on lepers. Alcoholic indulgence, as lowering the vital powers of the body, tends to hasten the fatal termination, besides causing its own complications."

Dr. Parker further remarks: "The above reported examination of real and supposed lepers was held on March 1st and 2nd; thirty-five persons were examined, including three really leprous, eight with suspicious symptoms, two with open syphilitic sores (needing hospital treatment), and several who were neither suspectable as lepers *in posse*, nor even visibly syphilitic. One woman (not herself showing leprous symptoms, but showing a conspicuous pinkish patch on one cheek) said that of her family, one brother and her stepmother had been sent to Molokai as lepers."

In regard to treatment, Dr. Parker says: "Of the few lepers who have come under my care in this district, none have been long enough (or diligent enough) under treatment for me to recommend any method as likely to succeed eventually in curing or retarding the disease here. But in Madagascar I found two methods which retarded the disease, viz:

A. Iodide of potassium in doses of 10 grains (gradually increased to 30 grains), two or three times a day, with tincture of perchloride of iron, in 10 drop doses, twice a day, taken after meals.

B. Gurgun oil and lime water, equal parts, administered both internally and externally; internally in 1-drachm doses, three times a day; externally rubbed all over the person, 5 or 6 times a day. Before such external application, the skin should be well rubbed with *dry sand* to remove all loose pieces of dead skin; and after each application soap and water may be used freely.

Method A is a practical test of the nature of a suspicious patch of skin, because local signs of improvement are soon evident under this treatment, if the disease is *not* leprosy. By either method the patient's health is greatly improved; while, by method B tubercles are gradually absorbed, and lost sensibility is recovered to a great extent. This is my own experience, and also the experience of physicians in charge of lepers at the Indian penal settlement of the Andaman Islands. For these islands I would advise a combination of these methods; thus, internally method A, externally method B (or salicylic acid, the application of which to leprous tubercles has been reported as causing them to be absorbed).

DR. S. E. CRADDOCK, WAIANAE DISTRICT, OAHU.

Dr. Craddock reports five lepers,—4 males, 1 female, and two male suspects, all Hawaiians. One married male (suspect) has four children and one male leper two children. Four of the cases have leprous relatives in a father, daughter, sister and brother.

The treatment adopted is galvanism, iodide of potassium and arsenic. The disease is said to be on the increase and has a tendency to progress more rapidly in alcohol drinkers.

Dr. Craddock says:

1. As long as lepers remain at large, it is almost impossible to treat them, as they hide and are screened by their relatives, in many cases with the connivance of the police. I would therefore recommend that a place be provided in each district where suspected cases could be kept three months say, under the supervision of the district physician before committal to Kakaako, or Molokai.

2. That the methods of treatment adopted by the physicians in charge of Kakaako be made known to the district physicians, and not enveloped in mystery as by Dr. Goto.

3. That such measures should be on a level with those of other countries, for which purpose communications should be exchanged periodically with other leper hospitals, *e.g.* in India and Europe.

4. That such remedies as Resorcin, Pyrogallin, Ichthyosulphate of Ammonium and Eucalyptol be tried, also nerve stretching and other recent methods.

5. That a periodical inspection should be made by the members of the Board of Health, in conjunction with two or more Physicians, not connected with the Leper Hospital.

6. That the police be directed to, in every way, assist the physicians in the detection of lepers.

DR. M. GOTO, BRANCH HOSPITAL, KAKAAKO.

BRANCH HOSPITAL, KAKAAKO,
HONOLULU, March 30th, 1886.

To His Excellency WALTER M. GIBSON,
President of the Board of Health.

SIR:—In reference to Your Excellency's request for information in regard to my method of treatment of the patients intrusted to my care at the branch hospital, I have the honor to report that;

In November last, Your Excellency permitted me to select ten (10) leprous cases at the Kakaako Hospital, to test my treatment upon. I have now no less than 39 cases, 13 males and 26 females, and I think I may claim to have obtained good results so far as improving the condition and appearance of the patients are concerned.

I only follow out a course of treatment that has been practised in my father's Hospital at Tokio, Japan, for many years, and one that has met with success among the Asiatic races from whom Hawaiians are supposed to be descended.

My treatment combines the hygienic, dietetic and medical.

First, as to the hygienic treatment: My patients are bathed in warm fresh water of the temperature of from 90° to 100° Fahrenheit. These baths are administered three times a day for the stronger patients, and twice a day for the weaker ones. Into this warm water is placed an infusion of a few ounces of Hichiyoubark for each person, together with certain proportions of Taifuushi and sulphur and other ingredients. The object of these baths is to promote not only cleanliness but free perspiration and an activity in the pores of the skin, giving a free circulation and a comforting feeling through purifying the system by getting rid of unhealthy secretions.

In this connection I would respectfully ask Your Excellency to induce the Board of Health to provide a resting room for the patients after their bath, as under present arrangements they are liable to catch cold in going to their rooms.

Secondly, as to the dietetic treatment, the object in giving strong nourishing food is to build up the debilitated system. I have adopted the regime of the Kihai Hospital at Tokio, or what is generally known as the Japanese Hospital for lepers. I feed the patients on rice, milk, beef, mutton, chicken, eggs, good strong broth, boiled taro, vegetables and fruit, but prohibit, as much as I possibly can, the use of sour poi, and also raw fish, when used with the usual native condiments. I feed the patients generously three times a day, but do not permit them to overeat.

As regards the medical treatment this naturally varies according to the condition of the patient, and the stage and character of the disease. The baths and the exterior applications create sensibility in the skin and in some of the anæsthetic cases, the comatose skin has been restored to sensibility and almost to the degree of original health, while tubercules have entirely disappeared. The two chief medicines that I use, in all cases, are Seiketsu-ren, as pills and in large doses, and Yoku-Yaku for baths. In the treatment of anæsthesia, tuberculosis, cutaneous inflammation, anæmia, neuralgia, diarrhœa and other intercurrent diseases accompanied by leprosy, I employ such other medicines for internal administration as tincture of chloride iron, sulphate of quinine, strychnine, iodide potass, vegetable tonics, gentian root, columbo, carbonate of soda and potassium. I find many of the alkaline salts especially adaptable for the disease in this country.

In concluding my report, I would respectfully say that the merits as to the efficacy or worthlessness of the system of treatment I am pursuing cannot be judged by the test of only four months; that I am giving satisfaction to the patients themselves is attested not only by the increase in number of those who voluntarily come to me at the Branch Hospital, but also in my private practice.

I have the honor to be,

Your most obedient servant,

MASANAŌ GOTO, M. D.

CASES UNDER TREATMENT.

Dr. Goto, under date of April 20th, 1886, reports that he has had under treatment at the Branch Hospital, Kakaako, 41 cases. Five of these cases, Nellie, Akeau, Oliva, Fisher (American) and Prosser, he reports as "almost cured," 19 as "improving," and 17 as "relieved."

Dr. Goto has received valuable written testimonials from some of his patients.

SUPPLEMENT.

BY AUTHORITY.



LEPROSY IN HAWAII.

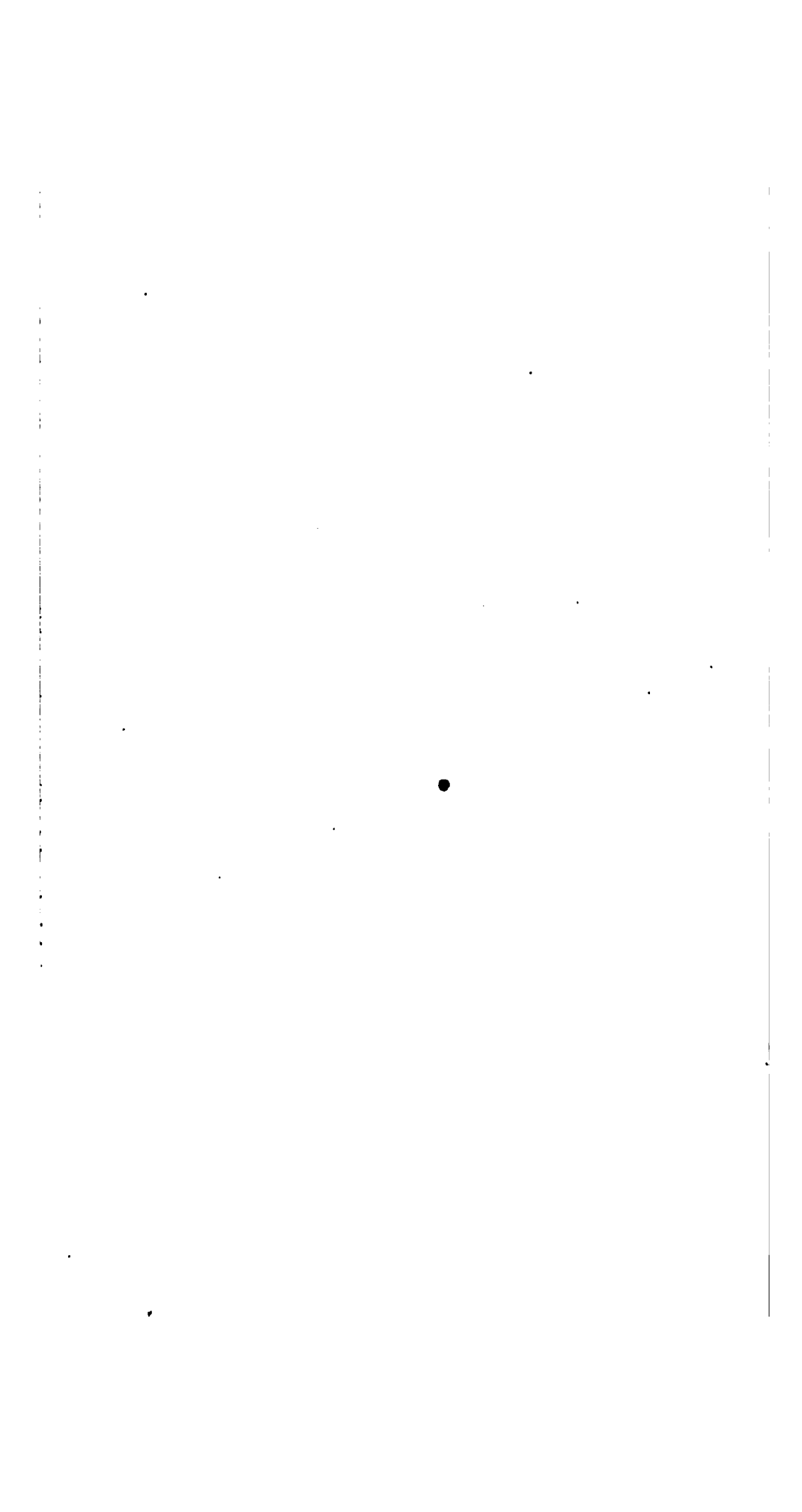
EXTRACTS FROM REPORTS

*Of Presidents of the Board of Health,
Government Physicians and Others,
And from Official Records,*

IN REGARD TO LEPROSY BEFORE AND AFTER THE PASSAGE OF THE
“ACT TO PREVENT THE SPREAD OF LEPROSY,”
APPROVED JANUARY 3RD, 1865.

The Laws and Regulations in Regard to Leprosy
in the Hawaiian Kingdom.

HONOLULU, H. I., 1886.



SUPPLEMENT
TO THE
REPORT OF THE PRESIDENT
OF THE BOARD OF HEALTH.

The following extracts from the records and reports of the Board of Health, since its organization, with the several statements of Government physicians and others, in regard to leprosy, are presented as a supplement to the Report of the President of the Board, and the Reports appearing in the Appendix thereto.

ORGANIZATION OF THE BOARD OF HEALTH.

A Board of Health was first organized in this Kingdom on December 13, 1850, by the following Order of King Kamehameha III:

BE IT KNOWN to all to whom it may concern, that, We, by and with the advice of Our Privy Council, hereby empower and authorize Dr: T. C. B. Rooke, Dr. George A. Lathrop, Benjamin F. Hardy, G. W. Hunter, C. Hoffman, M. D., Richard Hill Smyth, and W. Newcomb, to act as a Board of Health (four of them to be a quorum) for the good of the inhabitants of

Honolulu, and We hereby request and authorize them to communicate, respecting the same, with the Governor of Our Island of Oahu, and to point out to him, everything that in their opinion ought to be done or undone, removed or procured, for the preservation and cure of contagious, epidemic and other diseases, and more especially of Cholera, as may have occurred to each of them, on the day preceding.

Our Minister of the Interior is charged with the execution of this Our Order.

Done in Our Privy Council
this 13th day of December, 1850.

KAMEHAMEHA.

KEONI ANA.

REPORT OF DR. W. HILLEBRAND, SURGEON TO THE
QUEEN'S HOSPITAL, APRIL, 1863.

“Although it may not appear quite in place, I will here avail myself of the opportunity to bring to your and the public's attention a subject of great importance. I mean the rapid spread of that new disease, called by the natives “Mai Pake.” It is the genuine Oriental leprosy, as has become evident to me from the numerous cases which have presented themselves at the Hospital. Repeated investigations leave but little doubt in my mind about the contagious character of the disease, as I have followed its gradual spreading from a single person to many people in the same village. The contagious property does not seem to be strongly developed, but is sufficiently marked to warrant the application of some radical sanitary measure. For some time during the last year, I have devoted the wooden house which served as a temporary hospital before the

erection of the present building, to the reception of this class of patients. In some of them medical treatment has produced a sensible amelioration. It will be the duty of the next Legislature to devise and carry out some efficient, and at the same time, humane measure, by which the isolation of those affected with this disease can be accomplished."

EXTRACTS FROM THE RECORDS OF THE BOARD OF HEALTH.

HONOLULU, Dec. 28, 1863.

* * The Board of Health discussed other matters of importance to the health of the people in general, among them the *Mai Pake* as threatening to become more general, on which Dr. Hillebrand offered to report on some future time. The members of the Board* expressed themselves as desirous to meet the King's† wish in making the actions of the Board as useful and effective as possible.

HONOLULU, Feb. 10, 1864.

The *Mai Pake* was next discussed. The President having been acquainted with several cases of this disease on this island, and learning that the same was also spreading at the other islands, thought it wise that the Board should at once take the matter in hand and adopt measures to check as much as possible the spreading of this dreadful disease.

On suggestion of Dr. Hillebrand that all persons afflicted should be called together in order to be examined, etc., it was

* The Minister of the Interior, Geo. Morrison Robertson, W. Hillebrand, M. D.; Theod. C. Heuck, (Sec'y); and A. M. Kahalewai.

† Kamehameha V, then recently Minister of the Interior and President of the Board of Health.

Resolved, that, Mr. Jourdan be directed to take a census of those afflicted with the *Mai Pake* in and around Honolulu for the purpose of afterwards seeing them examined by the medical members of the Board to settle the question of hereditability, contagion, first origin of the disease and similar causes, and to report such census, desired to be as complete as possible, to the President of the Board. Which resolution was carried.

HONOLULU, May 25, 1864.

The *Mai Pake* was again discussed at some length; the Board regretted that this matter was as yet little explained, the reports on this subject from the other islands being very unreliable, and Mr. Jourdan was urged to report his census without delay so that Dr. Hillebrand might commence his investigation.

CHINESE LEPROSY.

By the letter of our Hawaii correspondent it appears that this terrible disease has commenced its slow but certain progress on that island. Is it not a shame that no steps have been taken to arrest this scourge in its incipency, which may yet prove more fatal and far more intolerable in its suffering than the small-pox. The last Legislature provided ways and means for the Government to act in establishing a sanitary commission, alas, Government seems to care little for the salvation of its poor dying out population.—*P. C. Advertiser*, May 21, 1864.

The letter referred to was dated Kona, Hawaii, May 12, 1864, and said:

“One year ago there was but one case of *Mai Pake* in

this district, and that poor native is now in a state shocking to humanity, still no measures have been taken for his removal from amongst the people, but on the contrary, hundreds of natives have been compelled to go or send to the very house he lives in to pay their taxes! And now, within a distance of five miles from that house cases of this incurable disease may be counted by the dozen, who are left to mingle with and spread still further its deadly ravages amongst our population!

"This surely, Mr. Editor, is a state of things which calls loudly for immediate steps to be taken to prevent the further spread of this disease from contagion, by having all the diseased cases collected and strictly kept apart in buildings for that purpose, there to be treated by the skillful hand of the physician. * * *

"We have the high authority of Dr. Hillebrand that the *Mai Pake* is the real leprosy; that it is now in our midst and attacking the best of our population is evident to those who go amongst the people; and as it is highly contagious, the foreigners no less than the natives are alike subject to its deadly and incurable attacks. This is, I think, a subject that vitally affects us all, and exertions should be made by all classes to have preventive measures at once adopted."

HONOLULU, Aug. 10, 1864.

The subject of leprosy (*Mai Pake*) was brought up before the Board, and its spread among the people reported. Dr. Hillebrand expressed his opinion that the disease is spreading. Since it was last considered in this Board, he had convinced himself that of the several new cases which had come to his notice, all were taken by contagion. The doctor was of opinion that isolation was the only course by which the spread of the disease could be arrested, and recommended some

valley as the most likely place to meet the necessity. A valley, too, which ought to be subdivided, so as to exclude the worst classes from the less virulent; he suggested that if Makiki valley could be procured, it was in his opinion the best adapted place, being within so reasonable a distance from town for the purposes required, and he had long since convinced himself that it was also the best spot in which to fix for an insane asylum, two objects which would not clash at all with each other. Makiki valley is well watered, and possesses many advantages. After discussing this subject more fully, the meeting adjourned.

AN ACT TO PREVENT THE SPREAD OF LEPROSY, 1865.

WHEREAS, the disease of Leprosy has spread to considerable extent among the people, and the spread thereof has excited well grounded alarms; and Whereas, further, some doubts have been expressed regarding the powers of the Board of Health in the premises, notwithstanding the 302nd Section of the Civil Code; and Whereas, in the opinion of the Assembly, the 302nd Section is properly applicable to the treatment of persons afflicted with leprosy. Yet for greater certainty, and for the sure protection of the people,

BE IT ENACTED, by the King and the Legislative Assembly of the Hawaiian Islands, in the Legislature of the Kingdom assembled:

SECTION 1. The Minister of the Interior, as President of the Board of Health, is hereby expressly authorized, with the approval of the said Board, to reserve and set apart any land or portion of land now owned by the Government, for a site or sites of an establishment or establishments to secure the isolation and seclusion of such leprosy persons as in the opinion of the Board of Health or its agents, may, by being at large, cause the spread of leprosy.

SEC. 2. The Minister of the Interior, as President of the Board of Health, and acting with the approval of the said Board, may acquire for the purpose stated in the preceding section, by purchase or exchange, any piece or pieces, parcel or parcels of land, which may seem better adapted to the use of lepers, than any land owned by the Government.

SEC. 3. The Board of Health or its agents are authorized and empowered to cause to be confined, in some place or places for that purpose provided, all leprous patients who shall be deemed capable of spreading the disease of leprosy, and it shall be the duty of every police or District Justice, when properly applied to for that purpose by the Board of Health, or its authorized agents, to cause to be arrested and delivered to the Board of Health or its agents, any person alleged to be a leper, within the jurisdiction of such police or District Justice, and it shall be the duty of the Marshal of the Hawaiian Islands and his deputies, and of the police officers, to assist in securing the conveyance of any person so arrested to such place, as the Board of Health, or its agents may direct, in order that such person may be subjected to medical inspection, and thereafter to assist in removing such person to a place of treatment, or isolation, if so required by the agents of the Board of Health.

SEC. 4. The Board of Health is authorized to make such arrangements for the establishment of a Hospital, where leprous patients in the incipient stages may be treated in order to attempt a cure, and the said Board and its agents shall have full power to discharge all such patients as it shall deem cured, and to send to a place of isolation contemplated in Sections one and two of this Act, all such patients as shall be considered incurable or capable of spreading the disease of leprosy.

SEC. 5. The Board of Health or its agents may require from patients, such reasonable amount of labor as may be approved of by the attending physicians, and may further make and publish such rules and regula-

tions as by the said Board may be considered adapted to ameliorate the condition of lepers, which said rules and regulations shall be published and enforced as in the 284th and 285th Sections of the Civil Code provided.

SEC. 6. The property of all persons committed to the care of the Board of Health for the reasons above stated shall be liable for the expenses attending their confinement, and the Attorney-General shall institute suits for the recovery of the same when requested to do so by the President of the Board of Health.

SEC. 7. The Board of Health, while keeping an accurate and detailed account of all sums of money expended by them out of any appropriations which may be made by the Legislature, shall keep the amounts of sums expended for the leprosy, distinct from the general account. And the said Board shall report to the Legislature at each of its regular sessions, the said expenditures in detail, together with such information regarding the disease of leprosy, as well as the public health generally, as it may deem to be of interest to the public.

Approved this 3rd day of January, 1865.

KAMEHAMEHA, R.

The section referred to is as follows :

§ 302. When any person shall be infected with the small-pox, or other sickness dangerous to the public health, the Board of Health, or its Agent, may, for the safety of the inhabitants, remove such sick or infected person to a separate house, and provide him with nurses and other necessities which shall be at the charge of the person himself, his parents or master, if able ; otherwise at the charge of the Government.

HONOLULU, Jan. 31, 1865.

At this, the first meeting of the new Board,* the subject of leprosy was considered, the President submitting a report on the number of cases found on the principal islands.

It was suggested that in order to obtain a complete knowledge of the disease, its contagion, etc., etc., a suitable place for establishing a temporary leprosy hospital should be selected.

HONOLULU, Feb. 23, 1865.

The President stated that the Board of Emigration was making arrangements with Dr. W. Hillebrand, the latter to proceed on a voyage to China and the East Indies for the purpose of procuring laborers for these islands, and that the Doctor would also direct his attention to the Chinese Leprosy, the *Mai Pake*, spreading among this people; the knowledge resulting from such enquiries being of the greatest benefit for all, would hereafter best enable the Board to adopt measures to treat and check this evil, and as the means at the disposal of the Board of Emigration was but limited, said Board asked to be supported by the Board of Health by assisting towards defraying part of the expenses.

On motion it was resolved that this Board pay at the rate of one thousand dollars per annum for one year towards the expenses incurred by Dr. Hillebrand's mission to the East, which motion was unanimously carried, but at the next meeting of March 11th, the resolution was reconsidered, and a resolution unanimously adopted to pay \$1,000 towards the expenses of Dr. Hillebrand's mission to the Immigration Committee.

* President ex-officio, the Minister of the Interior, Chas. Gordon Hopkins, W. Hillebrand, M. D.; F. W. Hutchison, M. D.; W. P. Kamakau, T. C. Heuck.

* * * The Board then discussed the subject of Lunatic Asylum and Hospital for leprosy. Several sites for either of these establishments were suggested ; among them for the leprosy hospital a lot in Palolo valley belonging to the estate of the late W. Webster.

THE "HAWAIIAN GAZETTE," FEB. 25, 1865.

"The action of the Hawaiian Government, on the subject of leprosy, is most commendable ; and provided the Act recently passed by the Legislature for preventing the spread of this loathsome disease, be promptly and efficiently carried out, the result will no doubt be highly appreciated by both the native and foreign population of these islands. The writer of these lines, during a long residence in the East, and especially in China, had many opportunities of meeting with persons, and even communities, afflicted with this really awful malady ; nor did he fail to collect all the information on the subject possible, under the circumstances. * * * * * We now come to what fell under the writer's own eyes, whilst residing in China. The Chinese believing the leprosy to be contagious, and having an unspeakable horror of it, act with the utmost inhumanity towards those afflicted with it. Parents consign their children, and children banish their parents, to walled villages seen outside of most Chinese cities, in Southern China. These dreadful places of misery, and even revolting vice, are so abhorrent to many Chinese that they frequently commit suicide to avoid entering those filthy dens. We have visited several of them, and have found that the first appearance of the disorder is a red spot, appearing sometimes on the legs, but usually in the face. This spreads to a round patch, or in irregular streaks. The skin seems thickened and stretched, and sometimes

smooth or shining. The lobes of the ear now become thickened, while the parts affected are all more or less numbed and insensible. As the disease advances, the hair and eyebrows fall off; the tendons of the hands and feet contract, distorting their appearance; and finally slow ulceration sets in, destroying the flesh and bones of the fingers and toes, leaving nothing but the stumps. Attention is particularly called to the fact, that the great distinguishing characteristic of leprosy is *invariable tendency to spread*, according to an extended observation in China. * * *

Sequestration from the healthy seems to be the only alternative in cases of this malady if we take the experience of both the Hebrews and Europeans, the Hindoos and the Chinese.

* * * The origin of leprosy is quite unknown. The Chinese medical men, some of whom have some skill, (in medicine alone) insist that two causes produce it, *i. e.*, hereditary transmission and sexual contact. From close observation, during five years, the writer is inclined to believe that it spontaneously arises, in many instances, from the peculiar idiosyncrasy, matured by heat, want of cleanliness, bad diet, or all these causes combined.

“The only remedies which seem to have any beneficial effect in the early stages of the disease are arsenic, salines, alteratives and acids. Lotions of corrosive sublimate in almond mixture, iodine and ointments of mercury, caustic potash, seems to affect the patches, but at only a very early stage; and not much even then, as external applications are not sufficient to eradicate a disease so deep seated, notwithstanding the fact that it properly comes within the head of cutaneous affections.

“In the treatment of leprosy, it should not be forgotten that it does not exist in cold climates, nor has it ever existed in such regions in so great a proportion, *per centum*, as in inter-tropical countries; hence, the position of the contemplated lazaretto ought undoubtedly to be in as cold a position as convenient. The information deducible from Chinese authorities may be

condensed (from a Chinese work on the subject), into the following statements :

“1st. It is affirmed by Chinese lepers and physicians that this disease is not *invariably* communicated from parents to children.

“2nd. That some married women (wives of lepers) often show no marks of the disease, though living in the leper communities. To this fact the writer has been an eye-witness.

“3rd. That it does not necessarily shorten life.

“4th. That it often dies out itself, in the third or fourth generation, yet such is not generally the case.

“5th. That a thorough leper is incurable.

“The above statements are given for what they are worth. The Chinese people are exceedingly observant ; and amongst the heaps of rubbish of which their medical books consist, some grains of real information may be found.

“The handsome means now in the hands of the Board of Health, for the alleviation of the Hawaiian lepers, speak much for the humanity of the Government ; but it is to be hoped that nothing on a large scale will be attempted at first. A small hospital for the sole reception of lepers, with the necessary appliances at command, will, undoubtedly, lead to some mode of beneficial treatment ; and curative measures may then, it is hoped, be discovered, producing vast blessings towards the afflicted. The writer has been induced to publish what he knew of the *Mai Pake*, in its own original home, China ; not with hope of settling the question, but of exciting public opinion, and drawing out what information may be available towards staying this veritable curse, and removing the cause of so much misery and distress. The worst form of the disease has not yet appeared amongst us, and now it is time for vigorous measures. May the Board of Health have the satisfaction of being able, soon, to apprise us of the success of their labors, and the cheerful co-operation of all classes, towards the extirpation of that pathless destroyer—Chinese leprosy.

DR. D. BALDWIN, LAHAINA, MAUI, APRIL 15, 1865.

"It is true that several lepers have been cured by the medicine I administer. Five persons used this remedy in Lahaina; three of whom were thoroughly cured, and two I ceased to prescribe for, as they did not follow the directions given and resorted to medicines prepared by Hawaiian 'kahunas.' I also gave the same drug to a woman living at Koolau, Oahu, and have since heard that she is quite recovered." * * * In regard to leprosy of long standing, I will give a case in point which was successfully treated here at Lahaina. It was that of a man, about fifty years of age, with the leprosy of fourteen years' continuance; his face was swollen, gross, lumpy and glistening, the ears thickened, the legs, arms, toes and fingers swelled, so as to entirely disable him from work. I gave him one pill night and morning; for about three months and a half, he was careful as to his diet, and at the end of the time above-mentioned he was entirely recovered. He has now been well for a year, and without any return of the malady. * * *

All the foreign physicians on the Islands possess this medicine as well as myself, and they know well how to prepare it for use. The physicians of Honolulu have used it with success. Dr. Good, of London, says of it, "There is no medicine so efficacious and powerful as this for the cure of leprosy." I consulted with the faculty of Honolulu regarding the disease, and Dr. Judd prepared me some medicine. Dr. Smith, of Koloa, has used it beneficially. Dr. Whetmore, of Hilo, recommended me to try it at Lahaina.

If the foreign doctors are so well prepared, whence this anxiety of leprosy amongst us? It is simply the ignorance of the natives; they desire to get well quickly, and run after every foolish thing called a "cure." Numbers of "kahunas" are using all sorts of medicines for the leprosy, some of which are foreign and some

native. Some believe that *awa* will cure them, some have a great regard for "Pain-killer," some scarify themselves with pieces of glass, while others eat the flesh of cats for the same purpose.

In 1863, there were fifty cases of leprosy in Lahaina, ten of whom died within the same year. The disease had made no great progress on some when they died, and in my opinion they were killed by malpractice. In one case the "kahuna" was a blind man.

The country will be benefitted by the law recently passed, to provide hospitals for lepers, but they should not be sent from one island to another, lest the infection attach to the vessel carrying them. It would be better to build two hospitals on Hawaii, two on Maui, and one on Oahu. If this be done and proper care taken, I have no doubt that in five years the disease would be eradicated."

FROM DR. D. BALDWIN, LAHAINA, APRIL 20TH, 1865.

"We have a foul and dangerous disease among us, and must, therefore, not quiet the fears of the public beyond what the truth will bear. The native population are not too much alarmed. In this region the healthy are often seen mingling with the leprous, which thing ought not so to be. In some of the extracts (of my letter in the *Kuokoa*) which you made, I have expressed myself strongly in favor of the curability of our Hawaiian leprosy, because I wished to turn the attention of natives from their ignorant and dangerous practitioners to foreign physicians. By extracting the paragraphs which utter this opinion, and omitting others, you make me seem to speak more confidently of future success in curing this disease than I intended to do; and therefore, I wish to add a few remarks by way of explanation; and,

"1. * * * The cases I was able to report are sufficient, I think, to encourage us to persevere in efforts to cure the frightful malady, and to banish it from the land. They should lead natives to look to those for help who alone can be supposed to have any means of combating so fearful a disease. They may be permanent cures, or the disease may break out more unmanageable than ever. Similar cures reported in other countries should encourage us.

"2. While I write thus hopefully, I am aware that men of the highest medical talent have studied the disease of leprosy, and they have sought for remedies, and many of them have pronounced it utterly incurable. It is certainly not a little staggering to our hopes in this matter, that while eminent physicians have bestowed so much attention, for many hundred years, and while the very remedies I have now been using have been used for ages in Asia and elsewhere, still there is a widespread belief that leprosy is an incurable disease. But there are authorities on the other side. An English medical dictionary has the finest description I have ever met with of the leprosy of the middle ages, which spread over Europe. The author says, recent cases may be cured, those of long standing are not easily cured. An eminent French physician says he has seen a multitude of cases of this disease treated without a single failure to cure. There is no way of accounting for such opposite opinions of great men, only by supposing that they are speaking of different species of the disease. * * *

"As your China correspondent well observes (Feb. 25), we have now only a mild form of leprosy. But, it will, doubtless, in time assume more terrible features. Indeed, we have already had, in this place, some horrible cases. The disease has been considered in all countries, contagious. It has been so in Lahaina, though it does not appear in a new subject till a long time after exposure to its infection; and we have the proof of it in several native families. We are beginning to have a crop of leprous young children."

HONOLULU, March 16, 1865.

Drs. Hutchison and Heuck then reported to the Board of Health on the lot in Palolo valley belonging to the estate of the late W. Webster; that they had visited the place and recommended it favorably to the Board for a temporary leprosy hospital, the lot is of ample size to commence operations for such an institution; that, if experience proves the locality of the place to be well suited for the purpose, no doubt more land adjoining it could be obtained, that there was an unfailing supply of water in the stream at the foot of the lot by which the lower part (about one-third of the extent of the whole could be irrigated for raising kalo and other vegetables, etc., etc.), and that other reasons in favor of this lot are:—the exclusion from populated districts; that but few natives lived in the valley; no houses near the spot where the little colony would be established, consequently no reasonable objection could be made to the selection of this place by the people in the valley.

The Board fully considered this matter, and, as it is advisable to select a place as soon as possible, even if it be only temporarily, to treat urgent cases, as also in order to obtain knowledge and experience in the treatment of this disease and the establishing of a system of rules and regulations to govern such hospital in the future when assisted by the information procured on this subject by Dr. Hillebrand in his mission to the East; the following resolution was unanimously carried, viz:

“That the President is authorized to purchase the lot in Palolo valley for the sum \$1,000.” * * *

HONOLULU, March 18, 1865.

The President reported that the lot in Palolo valley had been purchased and that the documents relating to such purchase were made out.

The Board again discussed preparations for the cure and possible cure of lepers, and considered a plan suggested by Mr. Heuck for establishing hospitals, dwellings, and other necessary requirements for a leprosy colony; the size of the dwellings were recommended to be rooms of 12 by 18 feet or the equivalent of such space intended to house three persons. Mr. Heuck was requested to draw up a plan in conformity with the views expressed by the Board, also to furnish estimates of the probable cost of these buildings and to report on it at the next meeting. * * * *

HONOLULU, April 3, 1865.

The Board divided the \$30,000 appropriated for general purposes in the following way, viz :

For hospital, etc., etc., for lepers.....	\$15,000
“ Vaccinators and vaccinations	1,500
“ Coroners’ inquests	500
Sanitary purposes on Oahu	2,500
“ “ Hawaii	3,000
“ “ Maui	2,500
“ “ Kauai	1,000
Office expenses of the Board and incidentals, also as reserve fund for emergencies.....	4,000
	<hr/>
	\$30,000

Mr. Heuck then reported on the plan for a settlement for lepers at Palolo valley and submitted a plan with explanations; the advantage of adopting a certain system would be that a part of it might be carried out at present, while afterwards, if answering, it would be so enlarged upon as to form a complete settlement for housing about 300 persons, ensuring easy and thorough supervision, admitting of division for each sex, as also of such separations as to

meet the requirements of different stages of the disease, without difficulty. On the plan a special section for severe cases was set apart, separating these from the general settlement, still rendering this section as easily controllable. The cost of this part was estimated at about \$6,500 to \$7,000. The section contains in an enclosure of 115 feet by 195 feet, 1 hospital building, 16x50 feet with separate yard, 1 luna's* house, 15x20 feet, 10 cottages of 12x15 feet each, 4 cottages of 15x22 feet each, all having verandahs in front of 6 feet wide; the luna's house with a verandah on three sides; to this is added a general cook house and double closets, and the enclosed ground required for this section, as indicated in plan, was enlarged so as to allow more space between the houses. Mr. Heuĉk offered to estimate again on this part of the plan as enlarged and improved by the Board and to report at the next meeting. * * *

HONOLULU, June 10, 1865.

The subject of leprosy was then again discussed. Two propositions were considered, the one was to establish a settlement both for light and severe cases at a place near Honolulu, by which plan the work might be simplified, expenses lessened, and the whole matter concentrated; according to this plan a piece of ground, say from 5 to 8 miles distant from town, located on the sea shore, of an extent of about 50 acres would accommodate a settlement in which the severe and probably incurable cases could be separated from the general settlement of lighter cases, each division supplied with its own hospital and dwellings.

The other proposition was to establish hospitals and dwelling for light cases in a place near the sea shore, near Honolulu, of about 5 to 10 acres of ground, there to care for, and possibly cure such lighter cases of

* Foreman.

leprosy, and to select a large tract of land on one of the other islands where to put those lepers that are incurable and by reason of the advanced state of their disease, might, therefore, communicate it to others. The northern side of Molokai was thought to contain valleys which were by nature favorably located for the purpose, containing hundreds of acres of cultivable land, abundance of water, separated from other parts of the island by steep palis, and the landings on the sea shore difficult to approach so as to insure the seclusion desired.

A settlement established in one of these valleys, and supported until it may become self supporting in some measure would probably offer greater comfort to the afflicted and more protection against the spread of the disease.

The members of the Board took the most favorable view of the latter proposition, and will again consider the matter in detail at the next meeting. The President* proposed, in case the second proposition was adopted, to visit Molokai soon to select a proper locality. * * *

HONOLULU, July 6, 1865.

Messrs. Rhodes and Heuck reported favorably on the lot makai† of Kalihi; they had again visited the place, thought it well suited for the purpose, being makai of all other dwellings, secluded and so located as to be easy of supervision, there is no fresh water running on the place, but so much of this lot, belonging to a native woman Wahineamalama, might be procured as bordering on the river, that there is a well on the premises, showing that others may be dug to ad-

* Hon. Godfrey Rhodes.

† Makai—Seaward side. Mauka—Landward side.

vantage. This lot of about 10 to 15 acres could be obtained for \$300.

They reported further that a lease held by W. Adams under Moehonua, can be had for about \$150 to \$500; this lease covers a tract of land adjoining the makai lot, of about 20 to 24 acres of good cultivable land; the yearly rent for this lot is \$30.

That D. Adams offered his lot adjoining the latter tract for \$1000 being about 9 acres.

The Board after fully considering this matter, thought it advisable to purchase the makai lot and the W. Adams lease only, and, on motion, resolved that the President be authorized to close for the purchase of these places, it being the object of the Board to locate the hospital for light cases of leprosy upon the makai lot and to use the leased land for raising kalo, potatoes, etc., etc., to support the hospital thereby as far as possible.

Mr. Heuck was then asked to design a plan for hospitals with necessary outhouses to commence with two buildings of about 20 by 60 or 70 feet each with verandah on one side, to house about 50 patients; besides a cook-house, privy, etc., etc., will be necessary.

The Board thinking favorably of the land on Molokai to be used for a settlement of severe cases of leprosy, on motion resolved that the President be authorized, if on examination the land is suitable for the purpose in his judgment, to take the necessary steps for procuring the same, also to do what is requisite preparatory to establishing a settlement thereon. * * *

FROM DR. WM. HILLEBRAND, SPECIAL HAWAIIAN
COMMISSIONER TO EXAMINE INTO LEPROSY, HONG
KONG, JULY 16, 1865.

* * * On my request Dr. Kerr accompanied me to the largest leper village near Canton. It is situated about two and a half miles from the suburbs of Canton, on a slight eminence, in the midst of cultivated fields, and accommodates between four and five hundred lepers with their children, born in the asylum. All persons recognized, or declared by the authorities to be lepers are sent to these asylums, of which there are three in the neighborhood of the city of Canton. Neither husband, wife or children are allowed to accompany the leper to the asylum, but they are allowed to choose themselves new conjugal mates from the inmates of the same. The children born from these unions remain in the village. I saw of them a great number, varying from the age of infancy to twenty-five years, and, in fact, judging from the great number of *sound* people in the settlement, the offspring would seem to be as numerous as the legitimate occupants of the place. Only one leper admitted that he was the son of another leper, then in the village. As a rule, they try to conceal their descent from diseased persons. The village itself forms a rectangle, surrounded by brick wall 12 feet high, with a gate which is closed every night. The following description may give you an idea of its inner arrangement: a street about 14 feet wide (wider than any street in Canton) leads from the street straight up from the temple or Josh-house. From this street branch out at right angles on each side about 14 narrow lanes $3\frac{1}{2}$ feet wide, each two separated by one single low building, partitioned again by a wall along its whole length and crossway by twelve to fourteen crosswalks, so as to form twenty-four narrow apartments. In these small holes that whole mass of population is stowed away

every night. Of course, I cannot speak with praise of its state of cleanliness, quite the reverse. During the day the gates are open and the lepers roam about at liberty, to beg through the streets of Canton. They receive besides, a small daily allowance from the Government, and the monopoly of the trade of coir rope making, by which they earn something in addition. I have given you this description more as a matter of curiosity than as a model of imitation, but you may induce from it this important fact, that isolation is by no means rigorous. The lepers leave the village in the daytime at leisure, and their friends enter as freely to visit them; circumstances which go far to demonstrate the popular opinion that the contagion is of a solid nature, not volatile or diffusible, and that it requires prolonged actual contact to communicate itself from one person to another. * * * * *

From what I have seen there, I am satisfied that there exist three distinctly marked varieties.

1. The knobby tubercular form, which appears principally in the face, and next on the upper extremities, last on the trunk and lower extremities, in rounded or knotty protuberances, from the size of a pea to that of a small walnut, sometimes forming also more extended broad elevated patches. They are glossy, dark red and generally anæsthetic. Their further development ends either in exfoliative ulceration or in absorption. The latter termination which may be considered to be a spontaneous cure, leaves a loose flabby pouch of skin in their places, under which the hardened substance is no more perceptible. Anæsthesia of the not affected extremities may, or may not, co-exist with this form.

2. The erythematous or crysipelatous form. This appears in large glossy patches, principally on the cheeks, sometimes dark red, but at other times little discolored, hardly elevated over the surrounding skin. The anæsthesia of the cutaneous nerves is not so well pronounced as in the preceding form, sometimes alto-

gether absent. Anæsthesia of the extremities may or may not occur in this form, which we have also observed, but rarely on our islands.

3. The simply paretic (paralytic) form. To this form, which I have frequently enough observed on the islands, but never recognized as leprous, there is paralysis or paresis of the extensor muscles of the fingers and hands, most frequently by those supplied by the ulnar nerve (4th and 5th fingers) but gradually extending over all the fingers of one hand, which then are curved or bent like bird's claws. Anæsthesia of the paralyzed portions is nearly always present, and extends to some distance up the forearm. The skin of the affected parts is also harsh, does not perspire, and frequently is covered with a light furfuraceous desquamation. There is nothing found on most of these cases to indicate a paralysis from central causes (cerebrum or spinal marrow), although hemiplegia is sometimes associated with it. When I have seen this form at our islands, it was frequently associated with inveterate psoriasis, to the effect of which disease on the cutaneous nerves I used to attribute the contraction of the fingers, but here I have seen it altogether independent of psoriasis or other cutaneous eruptions. In this form there is mostly no alteration at all of the skin, neither knotty tubercules, nor erythematous thickening, although it may associate itself with either of those forms.

Psoriasis, such a common concomitant of leprous disease on our islands, I have found to be quite uncommon here. As a very characteristic symptom of lepra, even in the absence of other signs, Dr. Kerr pointed out to me a deep atonic ulcer of the planta pedis, just under the capitulum of the first metatarsal bone, but although I have seen it in several lepers, I still hesitate to consider it an essential symptom of the disease. I had seen these ulcers in Honolulu without becoming aware of a leprous character in them. I am inclined to think that these ulcers are apt to arise in that locality, when the skin has become anæsthetic, or physically

dead, because it is most exposed to pressure in walking of all the parts in the *planta pedis*. It is, therefore, an accidental, not an essential symptom.

That the disease can run out its course of itself, I am satisfied from observation. In the village I saw an elderly man without any fingers or toes at all, even the remnants of hands and feet exhibited only short unseemly stumps, and yet there was no more trace of ulceration. The stumps were covered with, to all appearance, healthy cicatricial tissues, and the formerly existing tubercles in the face were absorbed, leaving large, flabby folds of skin.

As is well known, the Chinese take the disease to be hereditary, but there must be a good many exceptions to the rule, to judge from the great number of sound children of lepers which I saw in the village. The opinion is prevalent that the disease will run out, after it has passed through the fourth generation. The generation, I believe, is considered clean by law. Of course, all take the disease to be contagious, with the limitation pointed out above.

It seems to be well established that the disease does not occur in the north of China. Wealthy patients from the south, who have gone to reside in the north, have been cured of the disease, but it broke out again when they returned south.

With regard to curative measures I have learned nothing. In Chinese books a remedy is recommended, called *Tai Foong Tye*, which is found to be identical with the *Tshaul Ungra* (*gynocardia odorata*) some years ago warmly recommended by Calcutta physicians against the disease. The experiments, made at Canton, with it by Dr. Hodgson and others, are, however, not quite satisfactory. The plant is a native of the East Indies, and I shall endeavor to procure seeds of it, and also of the *Asclepias gigantea* which bears an anti-leprous reputation. * * * *

HONOLULU, September 5, 1865.

* * * The subject of leprosy was then discussed by the Board. Mr. De Varigny reported that the returns of assessors from nine districts on Hawaii and Maui showed about 120 cases of leprosy, mostly among persons of from 30 to 50 years of age; that 15 other districts were yet to be heard from, and the probability was that the total amount of reported cases would be from 250 to 300.

While the hospital at Kalihi was progressing, and while everything on Molokai looks favorably towards procuring the desired lands for severe cases of leprosy, the subject of transporting the sick from the various districts on the other islands to the inspection hospital at Kalihi, and from there back to their houses, or to Molokai, as the case may be, was discussed. It was thought best to purchase a vessel for this purpose in order to have complete control over it, rather than to charter one; which latter course would not only be more expensive, less reliable, and further hardly be right towards the public at large. A high charter might induce owners of vessels to hire such to the Board, and afterwards use them again for carrying passengers without that proper precaution due to the public health. * * * * * It was therefore moved to advertise for a vessel of from 40 to 50 tons to be offered for sale to the Board.

PURCHASE OF KALAUPAPA, MOLOKAI.

HONOLULU, September 20, 1865.

The President reported that he had, since the last meeting of the Board, again visited the island of Molokai, and had succeeded in procuring the desired tract of land at Kalaupapa. There are from seven to eight

hundred acres, excellent land for cultivation and grazing, with extensive kalo land belonging to it; there are from 15 to 20 good houses obtained with the land, the whole being obtained for about \$1,800 cash, together with some other Government lands given in exchange. A promise was made to the present inhabitants to remove them from there free of charge. Report adopted.

On motion of the President, Louis Lepart was appointed superintendent of the settlement Kalaupapa, Molokai, at a salary of \$400 a year. Mr. Lepart intending to live among the lepers sent there by the Board. * * * *

Mr. Heuck reported progress at Kalihi, that the establishment would be ready to receive the necessary furniture in a week or two. * * * *

At the next meeting, October 11, 1865, Mr. O. Bannister was appointed the first superintendent of the Kalihi Hospital, at a salary of \$900 a year from the 20th inst.

HONOLULU, November 3, 1865.

Dr. E. Hoffman was appointed by the Board of Health the first physician at the Kalihi Hospital at a salary of \$1200 a year, he to furnish all requisite medicine without extra charge. * * * *

The Secretary was directed to issue notices to lepers to report themselves on Monday the 13th inst., at the Kalihi Hospital for examination, accompanying said notices with copies of laws and regulations of the Board touching lepers. * * * *

NOTICE BY THE BOARD OF HEALTH.

WHEREAS, the last Legislative Assembly enacted a law entitled, "An Act to Prevent the Spread of Leprosy," which said law requires the Board of Health to take such measures as in their judgment shall be deemed expedient to endeavor to cure those persons who are afflicted with the disease, and to protect the public at large against contagion, at the same time fully empowering the said Board to carry out the purposes set forth in said Act,—

Therefore, all persons who are affected with leprosy, or who are suspected to be so affected, are hereby notified,

That, the Board of Health has established an hospital with suitable buildings at Kalihikai, on the Island of Oahu, about four miles from the city of Honolulu, where persons afflicted with leprosy will be inspected and medically treated, as well as carefully attended, with a view to effecting a cure. This hospital is carefully arranged by the Board, in order to ensure proper attendance and nursing of the patients, and at the same time to endeavor, by all possible means, to cure the disease with which they are afflicted. To this end, the Board will secure the best material and medical aid, and will carefully watch over the welfare of such lepers as may be committed to the hospital.

Time and experience will best prove the proper course to be adopted hereafter, but for the present, it is the intention of the Board to require that all cases of leprosy shall be removed to the hospital at Kalihikai for examination. All those who are reported as lepers, but found to suffer from other cutaneous diseases, will receive advice and medicine, and be either allowed to return to their homes, or receive medical treatment under the orders of the Board.

All cases of leprosy of which it is considered practicable to effect a cure, will be required to remain at the

hospital, in order to be properly treated and attended upon.

All such lepers as are in an advanced state of the disease, and liable to endanger the health of others who may come in contact with them, by spreading the contagion, will be required to remove to the settlement at Kalaupapa, on the Island of Molokai, which has been set apart for that purpose by the Board, and where all possible care will be extended to them.

In accordance with the foregoing Rules, the Board of Health hereby notifies all persons who may be affected with leprosy, to hold themselves in readiness to obey the directions of the duly authorized Agents of the Board, as to the time and mode of removing to the hospital at Kalihikai. Of this, proper and full notice will be given, and the Board relies upon a prompt compliance with the provisions of the law, and the rules and regulations issued for carrying the same into effect.

All public officers when called upon, and the public generally are requested to assist in carrying out these sanitary measures, so manifestly tending to the benefit of the public.

T. C. HEUCK,

Secretary Board of Health.

Office Board of Health, October 25, 1865.

[“Hawaiian Gazette,” November 18, 1865.]

OPENING OF THE KALIHU HOSPITAL.

This hospital, established for the examination and treatment of persons affected with leprosy, was opened on Monday last, the 13th inst., for the reception of patients.

According to notices sent out to about fifty persons reported to be lepers requiring them to appear at the hospital on the above date for examination, sixty-two

invalids reported themselves, showing the willingness and readiness on the part of our natives suffering from the disease, to conform to the rules of the Board of Health, so calculated to benefit them, and to avail themselves of the care and treatment which they, in their distressed condition, would receive at the hospital. They were accompanied by a large number of their friends, and at noon Dr. Ed. Hoffman, physician to the hospital, commenced a careful inspection of the sick. The doctor was assisted in the examination by Dr. C. F. Gilliou, who had kindly volunteered his valuable services.

The inspection resulted in finding forty-three persons affected with leprosy in its different stages; the remainder were not leprous, but suffering from milder diseases of other character, and had to be dismissed, on account of their being at present accommodations for about fifty patients only.

These persons were advised to call at the Queen's Hospital for medical advice and medicines to improve their health, or directed to call again at the Kalihi Hospital for that purpose, when the same had been placed in working order. Among the forty-three leprous persons, thirty-two were male and eleven female.

Owing to the large number of examinations made on Monday, and the great concourse of people who had accompanied their suffering friends, no more could be done that day except explaining to the patients the intentions of the Board of Health to improve their conditions, and what the Board and its officers desired them to do.

Many of the applicants for admission to the hospital not being ready to remain there then, were allowed to return to their homes to prepare for removal to Kalihi, and were required to return the next day, but several prepared to remain there at once.

The Board of Health was represented by Messrs. G. Rhodes and Th. C. Heuck on this occasion, the other members being unavoidably prevented from attending by other business.

In order to explain to the patients the purpose for which this hospital was established, as also to give some general rules for the guidance of its inmates, Mr. T. C. Heuck, in the name of the Board, addressed those present, explaining the Act of the last Legislature under which this hospital was founded, and explaining also the intentions of the Board, the rules and regulations thus far issued; that everything in the power of the Board and its officers would be done to care for and cure them; that proper attention to medical advice was desired of them; that they were expected to follow all directions as to cleanliness, diet and regularity, while at the hospital; that their friends might visit them once a week at stated hours; and that a prompt compliance on their part with the rules to be adopted for their good, would best assist in promoting their own interests; and further, that it was hoped that, God willing, proper medical aid, combined with comfort and care, sufficient and wholesome food, and the general provisions made for them at the hospital and elsewhere, the disease might soon be checked, and thus while those afflicted were receiving the requisite help, the community at large, at the same time, would be benefitted and guarded against a further spread of the evil.

The invalids listened with interest, no dissenting voice was heard, and all appeared satisfied and ready to do what was required of them.

The next day brought all forty-three patients again to the hospital. Since then seven more have been added, among them two children.

Both the doctor and the superintendent do the best they can for the inmates of the hospital. It is as yet too early to be able to report great results of the few days' treatment, although it will appear that the change for the better in living brought about by living at the hospital, has already had a good effect on some of the patients.

It is gratifying indeed to observe the readiness with which the natives come forward, the confidence which

they feel toward the Board of Health, and willingness to conform to our rules, which will much tend to lessen both labor and expense in carrying out the necessary measures to prevent the spread of leprosy, and in effecting cures wherever a cure is possible.

THE LEPER SETTLEMENT AT KALIHI.

[“Hawaiian Gazette,” December 2, 1865.]

We learn that this institution is getting on finely. There appears to be a strong disposition among the natives who are afflicted with cutaneous diseases to avail themselves of the facilities which the Government, by the authority of the last Legislature, have placed within their reach for the cure of leprosy. There are some fifty patients now at Kalihi and they all, without exception, appear to be extremely well satisfied with their quarters and the treatment they receive. A letter has been written by one of the natives there, who is quite an intelligent man, in which he gives an account of a day at the hospital. We translate a portion. He says: “Dr. Hoffman, who is the attending physician, comes early and attends very carefully on the patients. We think he is very earnest and faithful in his endeavors to cure us. There is but one feeling among us all, and that is respect for the Doctor and love to the Government which has thus carefully provided for us unfortunates.”

Such an expression of feeling from the natives themselves, goes far to prove the wisdom of the measures which have been taken to prevent the spread of leprosy, as well as the very proper and acceptable manner in which those measures have been carried out.

REPORT OF E. HOFFMANN, M. D., PHYSICIAN TO THE
LEPER HOSPITAL AT KALIHI, OAHU, MAR. 2, 1866.

To the Minister of the Interior. President of the Board of Health, Etc.*

SIR:—I have the honor to lay before you the following report, as physician at the Leper Hospital at Kalihi, Oahu:

Since the establishment of the hospital in November last there have been received and examined by me 165 persons, of whom 68 were discharged as not coming within the provision for which the hospital was established, and 104 remained for treatment. Of these 104, 47 have been sent according to your directions to the leper settlement on Molokai; 28 were found upon treatment to have been afflicted with other cutaneous diseases, difficult at first to distinguish from leprosy; but when so ascertained they were, however, according to your instructions, detained and cured, or some nearly so, and then returned to their homes with the privilege of obtaining money gratis for their perfect cures. Twenty-nine still remain under treatment, being the balance of those received from the Island of Oahu; but I expect soon to receive an additional number of patients from Maui.

Your Excellency will permit me, perhaps, to offer my remarks upon this fearful disease of leprosy, as I have found it during my course of treatment of the patients sent to the hospital.

The following synopsis generally accompanying the disease have been observed, viz.: General depression, a local sensation of heaviness, (kaumaha), fever, sometimes are premonitory symptoms of this disease more frequently, however, these are wanting, and the patients are not aware of being sick until spots, which I am now going to describe, are visible on the skin. The

* His Ex. Ferd. W. Hutchison.

changes consist at first in irregular livid red spots in the face, and at a later period the ears and nose are similarly attacked. In some instances the whole body more or less is covered with them or a somewhat scaly eruption. Slight itching is sometimes felt but not always. These spots are insensible to touch (anæsthesia). Regarding the symptoms, I insert the following remarks of Thelling:

“COMMENT DE LEPRO.—Coloris mutatis duplex est, nam vel rubræ nascuntur maculæ in pallidum vergentes, vel albæ et calorem flavum lividum aut rubrum tendentes. In priore casu Pili; qui in parte affecta sunt subflavi aut subrubri apparento; in posteriori casu albi conspicuuntur. Insensibilitas etiam utrique communis est, abque nisi duo, quas dixi, characteres conjuncti sunt, lepra haberi et vocari nequit.”

The spots referred to are somewhat elevated, shining, and by and by, become darker; after a shorter or longer period small, hard, or soft, tubercles appear, mostly in those on the face of the same color, which become after a while confluent and form irregular tubercles of the size of a pea to a hen's egg; the face now becomes much disfigured, the skin rough, full of wrinkles and fissures, similar to the skin of an elephant (elephantiasis tubercules); nose and ears are much increased in size, the first sometimes depressed in the middle; nostrils are enlarged, eyes become inflamed, the lids nearly covering the eye, lips are enormously swollen; the chin also, and the whole face has a horrid appearance. With this the voice becomes hoarse, and sometimes a difficulty of swallowing takes place. The nails of the hand and feet become affected; the former are raised by matter deposited under them. The feet and forearms swelled; ulcers form on the metatarsal articulations of the fingers and toes, without any pain. The skin becomes gangrenous, leaving the muscles bare. Joints are thus attacked and destroyed in succession by the slow progress of this terrible disease, which renders those affected with it objects of horror. During the progress of the disease the pulse is regular, appetite good, and no apparent internal morbid symp-

toms take place. How this disease terminates in death I have not yet been able to observe, as, so far, none have yet died in the hospital. In my opinion this is the form of lepra called "Elephantiasis Sea Lepra Græcorum." Here, the disease is complicated in most instances with syphilis and psoriasis, scabies and cognate diseases. In no instance that has come under my observation have I been able to trace this disease to a true, and to me, satisfactory origin. From all the information I can obtain, I am led to believe that, though the disease had existed previously in this country for many years in single and scattered instances, yet within the last fifteen years it has assumed a more spreading and malignant character, caused, perhaps, in a measure by the type of syphilis and cutaneous diseases introduced into the country by coolies within fifteen years. It affords me great satisfaction to state that all the patients received and treated at the hospital have, owing to the liberal and generous treatment of food, dwelling and cleanliness afforded by the Government, combined with medical attendance, most materially improved in their condition, by being cured from those combined diseases with which they were affected at the time of their reception. How far the leprosy itself when free from these aggravating complications is curable I have not yet had time to ascertain, owing to the removal of the patients to Molokai for the purpose of being isolated, but I hope as soon as it may be practicable, and all the afflicted have been collected, a portion may be returned to the Kalihi hospital for further treatment, and to ascertain that important fact. Whether the disease is contagious or not I have not had sufficiently reliable data to enable me to pronounce an opinion upon. Except three instances no one received at the hospital acknowledge that either their parents, their children, relations or cohabitants were afflicted with it. I am inclined, therefore, to assume that if contagious, it is only so on a close and continued contact with a leprous subject, and under others not yet fully ascertained predisposing causes.

It affords me, in conclusion, the great pleasure to report to Your Excellency, the happy effect upon the lepers the establishment of this hospital has produced, and the grateful and contented condition of mind of those so terribly afflicted. * * * *

REPORT OF THE BOARD OF HEALTH TO THE LEGISLATURE OF 1866.*

Nobles and Representatives:

In accordance with the provisions of an Act passed at the last session of the Legislative Assembly, entitled "An Act to prevent the spread of Leprosy," the Board of Health have the honor to report as follows:

Shortly after the passage of the Act referred to, the then Minister of the Interior convened the Board for the purpose of taking into consideration the important matters committed to its care. After due consideration, it was concluded to purchase a tract of land situated in Palolo Valley, Oahu, for the purpose of erecting a hospital, as contemplated by Section IV of the Act, As soon however as the action of the Board became known, owners of property in the neighborhood of Palolo, especially those owning lands bordering on the stream which issues from the valley, objected strongly to the location of the proposed hospital at that place, the principal reason given being that the water of the stream would become contaminated and dangerous to health. These objections appeared reasonable to the Board, and a search was at once instituted for a locality which from its position would obviate any reasonable objections by owners or occupants of lands near the establishment which it was proposed to erect. This, however, was found to be no easy task, inasmuch as a full supply of

* Reign of His Majesty King Kamehameha V.—Third year.

water was one of the first requisites. Finally, a site was procured at Kalihi, bordering on the stream of that name, and buildings have been erected thereon capable of accommodating sixty patients, together with the necessary outhouses, kitchen, bath-houses, and superintendent's dwelling. This locality has proved well adapted for the purpose contemplated, being isolated from other habitations, within a short distance of Honolulu, enjoying a fine current of air, and of easy access by the Board and its officers as well as by the physician in charge of the health of the patients.

In addition to the hospital established for the reception and examination of all reported as lepers, and the attempted cure of those in the early stages of the disease, a permanent settlement has been formed by the Board on the northern side of the Island of Molokai. The present President of the Board has visited that locality twice, and has effected the purchase of all private rights in the valleys of Waikolu and Wainiha, which rights have been transferred to the Board. The principal portion of the land belonged to the Government, but was held by a company under a lease, the transfer of which had to be negotiated.

The tract was extremely well situated for the purpose designed. It is difficult of access from the sea; has no roads passing through it into other districts; is supplied with water by two running streams; has a large area of kalo land; enjoys the advantage of the constant trade wind; has ample grazing lands; and possesses a soil capable of raising vegetables of all different kinds adapted to these islands in the greatest abundance. These lands are situated on a peninsula, washed by the sea on three sides, and bounded by high precipices on the south, the only access being by a path cut in the pali of 1,800 feet elevation.

In purchasing the rights and interests of private parties in houses and lands, the Board made use of the agency of Mr. R. W. Meyer, to whom they are much indebted for the zeal and interest he evinced in perfect-

ing the arrangements required to be made. Some of the lands, houses, etc., were paid for in money, (for which see Appendix exhibiting the expenditures of the Board), and for some, other lands on the same island belonging to the Government were given in exchange. A few days since a large tract of land, known as Makanalua, belonging to the estate of the late Haalelea, and immediately adjoining the leper settlement, was purchased for the Board. This acquisition gives the Government the ownership of nearly all the lands on the peninsula, and separates by a long interval the few persons who reside at the landing place at Kalaupapa from the lepers, rendering any intercourse with them both unnecessary and excuseless.

A supervisor has been engaged to carry out the arrangements necessary for the comfort of those unfortunate people, who reside on the land, and is the medium of communication between the settlement and the Board.

By reports furnished to the Government by the different Tax Assessors, by direction of the Minister of Finance, the following number of persons on the different islands were represented as afflicted with the disease of leprosy :

Hawaii.....	75
Maui, Molokai and Lanai.....	112
Oahu.....	80
Kauai and Niihau.....	7
Total.....	<hr/> 274

The hospital at Kalihi having been finished and furnished, and the necessary officers and attendants provided, the Board proceeded with the onerous duty of collecting and removing thither every person whose name had been reported to them as suffering with the disease.

The lepers residing on Oahu were first required to at-

tend at the hospital. It had been anticipated that no little difficulty and opposition would be experienced in attempting to carry out the provisions of the Act, but the reverse of this was the case. A much larger number from the Island of Oahu, who were received at the Hospital and examined by the physician, will appear by his report to the Board on the 2nd of March, 1866.*

* * * * *

All the known cases on Oahu have been examined and cared for, but there is reason to believe that a few still remain concealed by their friends. Enquiries are still being prosecuted on this point.

Sixty-nine patients have been brought from Maui, and it is believed that there are no more cases remaining on the western part of that island. Those reported on East Maui are now being brought from thence by direction of the Board, after which those on Hawaii will be taken in hand, and it is hoped that the Kingdom will have been thoroughly gone through with in from four to five months.

The whole number of persons examined at the Kalihi Hospital up to the present time is 234, of whom 76 were discharged as not being lepers, 57 have been sent to the settlement at Molokai, a number have been ascertained to be afflicted with cutaneous and syphilitic diseases, and the remainder are under treatment at the Hospital.

The Board have deemed it advisable to purchase a few beef cattle, sheep, goats, etc., for the use of the settlement at Molokai, in order that it may, as far as possible, become self-supporting in the future.

It is gratifying to be able to state what is undoubtedly a fact, that the condition of these poor people has been improved in every respect by their having been transferred to the care of the Government. Their general health has improved, and they enjoy a greater degree of liberty than when living among their friends,

* Vide Dr. Hoffmann's Report, page 34.

where they were usually confined to small huts, ashamed to show themselves and shunned by every one. We are informed that those sent to Molokai have settled contentedly on the place, and those able to work have commenced to erect new houses and cultivate the land, feeling that they are permanent settlers there. They express themselves satisfied and contented, and appear to be so. In a few cases, fathers, mothers, wives and husbands have been allowed to accompany their afflicted relatives.

Dr. Hillebrand, the King's Commissioner to China, was instructed to visit the Leper Establishments in the different countries which he was about to visit, and report to the Board as to the method of isolation, medical treatment, etc., which is pursued in those countries. The sum of \$1,000 was appropriated out of the funds at the disposal of the Board to defray a part of the Doctor's expenses. He has communicated what he has learned, up to the date of his last letter, but unfortunately it amounts to little more than that which observation had already taught us here, as the class of people in question are generally shunned and little cared for among the nations in which the disease is developed and propagated.

Several attempts were made by the Board to purchase or charter a suitable vessel for the transportation of the sick, but for some time without success. Finally the schooner Warwick was engaged at the rate of \$250 per month, but there being some delay in her trips, the Board have purchased her for \$800, and it is hoped that the work will proceed with more expedition than before.

The land purchased at Palolo is still the property of the Board. It will probably be taken by the Government for other purposes.

The important question as to whether the disease is contagious, and if so, under what conditions, as well as its curability, is still a matter of doubt. On this point

the Board again refers to the report of the physician.
* * * * *

No epidemic has visited this Kingdom during the last biennial period. Reports of suspicious cases, resembling small-pox, have on two or three occasions been made to the Board. Prompt action has been taken in each case, and the patients isolated and cared for.
* * * * *

Medicines have been sent, whenever applied for, to competent persons willing to distribute them gratuitously, to relieve the poor and diseased, and it is believed that many lives have been saved and much misery relieved by those philanthropic persons.

F. W. HUTCHISON,

President of the Board of Health.

EXPENDITURE OF THE BOARD OF HEALTH, DURING THE
TWO YEARS ENDING MARCH 31st, 1866.

To check the spread of leprosy, viz.:

Land in Palolo Valley.....	\$1,002 50
Payment towards Dr. Hillebrand's Mission....	1,000 00
Lands on Molokai.	3,471 75
Lands at Kalihi, Oahu.....	665 00
Buildings, fences, and other improvements at Kalihi.....	3,702 03
Furniture, etc., for same.....	764 50
Current expenses at the Kalihi Hospital, including Doctor's and Superintendent's salary, medicines, pay of servants, etc., from Nov. 12th, 1865, to March 31st, 1866.....	982 75
Paid for provisions and clothing at Kalihi. Hospital during same time.....	1,039 15
Paid for provisions, clothing, medicines, agricultural implements, tools, canoe, fishing nets, carts, oxen, etc., for the settlement at Molokai.....	1,801 43
Paid for cattle, sheep, goats, poultry and other live stock for above settlement	450 00

Superintendent's salary at Molokai, 4 months..	133 37	
Paid schooner "Warwick," as per charter....	1,000 00	
		\$16,012 48
General expenses of the Board of Health....		7,231 21
Total..		\$22,243 69

REPORT OF THE BOARD OF HEALTH TO THE LEGISLATIVE ASSEMBLY OF 1868, BY HIS EXCELLENCY F. W. HUTCHISON, PRESIDENT.

Nobles and Representatives :—As required by the Act of the Legislature passed on the 3rd day of January, 1865, the following report is respectfully presented to the Legislative Assembly on the part of the Board of Health.

The duties imposed by the above Act, were of the most onerous and delicate kind, and the Board could not hope to perform them with fidelity and success without encountering many difficulties. But the obstacles actually met with have exceeded even the anticipations of the Board. They were caused, partly, by the lepers themselves; partly by the apathy and want of co-operation on the part of the public, and partly by the inadequacy of the appropriation which had been applied for by the Board, and granted by the last Legislature. The insufficiency of the fund was soon discovered, and the strictest economy, and the most rigid supervision of the expenses became necessary, nearly \$10,000 having been expended the first six months of the biennial period, expiring March 31st of the year 1868.

One of the greatest difficulties experienced by the Board has been the lack of means of transportation.

* * * * *

Again, when the lands were purchased on Molokai, it was confidently expected that the first outlay there, would be the principal one required, and that the Valley

of Waikolu, and surrounding lands, than which no richer can be found throughout the group, would be cheerfully cultivated by the strongest of the lepers, and that, except for clothes and perhaps some animal food, the resources at the disposal of the Board would not be subjected to a regular and constant drain. But a great disappointment was soon experienced in this respect; the terrible disease which afflicts the Lepers seems to cause among them as great a change in their moral and mental organization as in their physical constitution; so far from aiding their weaker brethren, the strong took possession of everything, devoured and destroyed the large quantity of food on the lands, and altogether refused to replant anything; indeed, they had no compunction in taking from those who were disabled and dying, the material supplies of clothes and food which were dispensed by the Superintendent for the use of the latter; they exhibited the most thorough indifference to the sufferings, and the most utter absence of consideration for the wants, to which many of them were destined to be themselves exposed in perhaps a few weeks; in fact, the most of those in whom the disease had progressed considerably, showed the greatest thoughtlessness and heartlessness. The Superintendent, therefore, in the month of September, 1866, informed the Board to its great surprise, that supplies must be sent for the future from Honolulu, as the settlement would be able to produce but little from that time forth. This state of things, which it was hoped for some time might be changed, has been found irremediable, and the Legislature must be asked to supply absolutely for the future all the wants of these people. Such a state of things is to be regretted, but inasmuch as the lepers are deprived by the law of the ordinary rights of citizens, and as a restraint is placed upon their liberty for the *good* of the community at large, that community incurs a responsibility, which with its accompanying burthens, must be honorably and cheerfully accepted. It is hoped that in a few months it will

not be necessary to send ordinary provisions from Honolulu, as the Board has lately removed all the lepers from the Waikolu Valley, where the Kalo lands are situated, and leased those lands on the condition that the necessary supplies of kalo and pai ai are furnished to the order of the Superintendent. A supply of pai ai, averaging about 130 pounds per diem, has been obtained from the settlement and adjacent valleys for the last six months, and it is hoped that a large quantity may be obtained in the coming summer months, in which case the supplies needed from Honolulu will be very materially lessened. In justice, moreover, to the lepers, it must be recorded, that sweet potatoes and other vegetables in considerable quantities have been planted by them, but as the late stormy winds and cold rains have destroyed most of the plants and vines, very little food will be derived from this source; it must also be observed, that those who plant, consider themselves entitled to the same ordinary supplies as those who do not, and it is difficult to perceive the injustice of this claim. Again, one of the symptoms of this disease is an extraordinary increase of appetite, a great voracity, and constant longing for food; the quantity each patient will devour, if left to himself, is incredible to those who have not witnessed it; this craving never appears to be satisfied, and in two or three instances when opportunities of gorging the stomach with animal food have presented themselves, death in a few hours has been the result.

In connection with this food supply in Molokai, it should be remembered that letters were published in Honolulu on or about January, 1867, reflecting severely on the Board for its alleged want of care of the Molokai Settlement, and distinctly charging it with inhumanity in allowing the unfortunate people sent there to perish from starvation and the want of ordinary necessities of life. Upon this, at the request of the Board, its President took the first opportunity of visiting the Settlement. He called at every house, and had com-

munication with every one of the patients, who all denied absolutely having made any such statements or complaints as were attributed to them; they stated indeed, that they had some pilikias, that they would like to have more food allowed them, and that they wished to kill the cattle belonging to the Board, which they understood had been sent for their use; but as a general thing, they were satisfied with what had been done for them, and with Mr. Lepart their superintendent. So far from being in the miserable condition described in those letters, most of them looked well and stout, compared with their appearance when first entrusted to the Board. The peculiar and frightful nature of the disease might easily mislead non-medical men who carefully avoid contact with the subjects of it, or even medical men who had had no previous experience of it. But while the parties who made the adverse reports thought that they had found evils which really had no existence, they, owing to the superficial nature of their examination of the settlement, altogether omitted to notice wants really existing and palpable. The President of the Board says that two things were absolutely necessary: First, a hospital for the accommodation of those who were in the last stage of leprosy, or of other diseases of which leprosy was the cause; and secondly, a female nurse, with some knowledge of medicine, who would sympathize with the sufferers, and take charge of the establishment when the building should be erected. Orders were therefore given to Mr. Lepart to have such building put up at once, and efforts were made to secure the services of a person competent to take charge. With the first, however, it was found that nothing could be done, from the resources on the spot, towards erecting the proposed establishment. The patients themselves would do nothing, and the people of Kalau-papa, after a feeble attempt to undertake the work by cutting a few posts, declined troubling themselves further about the matter. Workmen and materials had therefore to be sent from Honolulu, and the Board is

happy to report that a comfortable building, capable of supplying the wants of the settlement has been erected and used for some months, greatly alleviating the miseries of the poor sufferers, and smoothing their inevitable course to the grave. * * * *

As may easily be imagined, one of the most serious troubles on Molokai, to the Board and manager, has been the difficulty of maintaining order. Drunkenness, pilferings, immorality and general insubordination were very prevalent; ki-root beer was manufactured and drunk in very large quantities, and great orgies took place. But the Board is happy to report that for the last few months a very different state of things has existed. Drunkenness and insubordination have almost entirely disappeared, and it is to be hoped that further experience in the management will tend to develop a system well calculated to produce a good and desirable result. The change has been mainly brought about by the appointment of Mr. Walsh as Magistrate for the Peninsula; by this means he is enabled to keep the residents under control. It has been further assisted by making constables out of the husbands of diseased women. These men in return for their services are allowed, at their own request, to reside with their wives, rations and clothing being issued to them in the same quantities and at the same times as to the lepers themselves.

In addition to the hospital, a comfortable house has been erected for Mr. and Mrs. Walsh, as also a school house for the children, and separate sleeping apartments for the boys and girls. All these buildings, including the hospital, are enclosed within one fence, and are under the exclusive care of the superintendent and nurse. * * *

A serious cause of embarrassment has been the separation of families. In some cases this has produced no feeling whatever in the parties interested; sometimes, indeed, the separation is felt to be a relief; in other cases it has been regarded as a great grievance,

and, in consequence, many lepers are carefully concealed from the knowledge of the Board. There have been two runaways from Kalihi, and all enquiries have failed to elicit the places of their concealment. Whenever wives, husbands, or parents have expressed a desire to accompany their relations, the Board has not thought it would be justified in refusing the application; it would seem right, however, that some provision should be made by law for the support of those children of lepers who have no friends willing to take charge of them. It is also worthy of the consideration of the Legislature, whether divorces should not be granted to the wife or husband of a leper, if the said leper has been certified as having the disease—whether, in fact, the party afflicted should not be regarded by the Court as “civilly dead.”

* * * * *

Inasmuch, however, as the only justification for taking possession of these people, and depriving them of their personal liberty, is the attempt to exterminate the disease, complete and absolute isolation should be recognized as necessary.

Is the disease contagious?

Although there is high authority in other countries to the contrary, the Board believes that it may pronounce a positive opinion in the affirmative, and it is believed that opinion will be upheld by every physician on the islands who has had experience of the disease; but it can hardly be determined exactly under what conditions the contagion takes place; it does not appear to be very active; and probably (under ordinary circumstances) it does not occur in the early stages of the disease; but in the ulcerative form the danger is great. By reference to the returns from Kalihi, it will be seen that the male sex are more liable to the disease than the female, and experience shows that the latter communicate the disease much more rapidly than the former. It may be worth mention, that there is a man on Molokai in the last stages

of leprosy, who has a wife apparently healthy; this woman has had two husbands who have both shown the disease after their marriage to her. There can be no doubt the disease is inherited in some cases, but it does not show itself until after the sixth year after birth.

Is it curable?

To this question we are constrained to answer "No!" At least, not under any known treatment.

This has been the experience of all countries and ages to the present time, and it would seem desirable that leprosy patients should understand this; it is cruel to hold out hopes that can never be realized. Cures have been reported which seem real, but they have no doubt been cases of other diseases, difficult to discriminate from leprosy in the first stages of their appearance. Medicine and hygiene will ameliorate the condition of the victims for a time, especially when first used; but soon the poison begins to make fresh way, and, despite what is done, the inevitable result will occur, viz.: a premature death. The duration of the disease varies much; in some cases the operation of the disease goes on for many years; in others it runs its course very quickly. The following is the ascertained duration in 171 individuals.

Of 15 years' standing	2 cases
" 14 " "	3 "
" 13 " "	2 "
" 12 " "	7 "
" 10 " "	9 "
" 9 " "	7 "
" 8 " "	32 "
" 3 to 1 years' standing	94 "
Under 1 " "	15 "
* * * * *	

Statement of expenditures for the biennial period, ending March 31, 1868:

Kalihi Asylum.....	\$ 9,241.54
Molokai Asylum.....	15,562.06

\$24,803.60

KALIHI HOSPITAL.

Since opening in November, 1865, to March 31, 1868.

Number presented for examination officially or voluntarily.....	711
“ Discharged as not being lepers	375
“ Admitted to the hospital.....	336
“ Of the latter afterwards discharged from the hospital as having merely cutaneous diseases.....	107
“ Of the latter afterwards returned to the hospital as lepers.....	7
“ Sent to Molokai	174
“ Died	17
“ Run away	2
“ At present at hospital	43
Whole number admitted as lepers	336
Males, 223 ; females, 113 ; children, under 14 years of age, 16.	

MOLOKAI.

Number entered since opening	179
“ Discharged.....	6
“ Died.....	47
“ At Asylum March 31, 1868	126

REPORT OF THE BOARD OF HEALTH, 1870, FERD W. HUTCHISON, PRESIDENT.

Nobles and Representatives:

In compliance with Sec. 7 of the “Act to prevent the spread of Leprosy,” the Board of Health respectfully submit the following report:

When the Legislature in 1865 placed upon the Statute Book the above named Act, they recognized the existence amongst us of a disease, rapidly extending itself, believed to be contagious by those who had opportunities of observing its progress amongst the people and causing considerable alarm to the majority of our citizens. It had been a subject of agitation for years previous, whether a stringent law should not be

passed for the isolation of those afflicted with the malady, in the same manner as is usual in those countries whence it has been derived. The agitation of the matter culminated in the law, whereby the Minister of the Interior as President of the Board of Health, acting with the approval of the Board, is authorized to isolate and confine all leprous patients who shall be deemed capable of spreading the disease of leprosy.

* * * * *

Many difficulties had to be overcome, but it is gratifying to say that the work has been accomplished on the whole in a satisfactory manner; it is believed that there are now few lepers not under supervision.

* * * * *

Dr. Hoffmann, physician to the Kalihi Hospital, reports that "no new cases, either genuine or doubtful came to his knowledge, during the last six months, and it may therefore be presumed that the measures of H. M.'s Government to prevent the spread of the disease have produced very good results." No doubt fresh cases will present themselves from time to time, but there is good reason to believe that if isolation is rigidly enforced for some years, the same result will follow here as in all other countries where that policy has been pursued, viz., a final disappearance of the disease.

* * * * *

The duty confided to the Board is a delicate and difficult one, the forcible separation of individuals from their friends and the world, although necessary for the welfare of society at large, must appear harsh to many of those afflicted, and even to many persons not personally interested in the matter; more especially is this the case to those who conscientiously think the disease not to be contagious or dangerous to those who habitually live with the lepers—many such persons are in our midst, and the Board is bound to say, that such an opinion is promulgated by many physicians in India and other countries, where the disease has been known from time immemorial. Some years since, the British

Government requested the College of Physicians in London to examine and report on the subject; they sent circulars to all the medical officers of the army in India, as well as gentlemen in private practice, and received some hundred of replies, some reporting that it was decidedly contagious, and some that it was not; it is not unfair to say, however, that most of those making reports had not paid attention to the history and character of the disease, on which they gave an opinion—in fact, it may be said, that no attention whatever had been paid to the subject until called forth in this manner; and it is a well known fact that many of the gentlemen who reported as to its non-contagious character have since changed that opinion, brought about from a continued study of the disease. Several works by professional men have lately appeared on the subject; one of the latest treats of the disease as observed in “Surinam,” and the author, Dr. Landre, amongst others, gives “twelve cases of children of European parents who contracted the disease, the parents being perfectly free from all suspicion of it, being of the higher classes and in easy circumstances. They could not have inherited it; but all were known to have come in contact with Lepers.” This opinion entirely agrees with the observations made in this kingdom, by those capable of judging the facts; and the Board have no hesitation in re-asserting the opinion made in their last report that “the disease is contagious,”—that it is a distinct morbid poison introduced into the blood by a person suffering from the complaint, and that it is also transmitted by inheritance, of the latter assertion there can be no doubt whatever—in the early form the danger of contagion does not appear to be great—it would also seem that the development is very slow in most cases, but active and sudden in a few. It is the opinion of some, that the disease is caused by syphilitic disease and is merely an ulterior consequence of that disease; there are others who insist that the cause must be looked for in the use of

“Awa.” Neither of these opinions can be entertained for a moment. Whenever a preconceived opinion has been made on the origin of a disease, it is easy to discover facts apparently supporting the idea; the notion that “awa” for instance is connected with the trouble is upheld in this manner. “Have you ever taken awa in quantities?” “Yes!” and the answer is put on record as irrefragable proof of the truth of the theory. It is well known that the Hawaiian people universally believe that “awa” is a sovereign remedy for all kinds of skin diseases, and are certain to go through regular courses of the drug when so afflicted, the answer in the affirmative may therefore be relied on. The Board is pleased to say that with the lepers themselves very little trouble or opposition to the law has been experienced, as a general thing they willingly resign themselves to its orders, and in most cases, they no doubt are placed in a more comfortable position than when residing with their own friends. Still, most painful scenes are sometimes experienced on the forcible separation of husbands and wives, parents and children; in all such cases every endeavor has been made to lighten the stroke as much as possible, and these endeavors have been attended with considerable success.

Three large houses adjoining the Hospital capable of lodging twenty-five persons each, have been erected in the settlement, with cook house, and separate buildings for the male and female children. House frames for the lepers in the general settlement have also been supplied, and sufficient accomodation to lodge all in a comfortable manner is now provided in the Asylum.

* * * * *

The necessity for extraordinary legislation to preserve order in the settlement is very apparent. The law as it now stands “authorizes isolation and confinement in some place or places for that purpose to be provided,” but provides no means outside the ordinary courts of the Kingdom or the general laws of the country for that purpose—it is clear that in a case so exceptional,

the usual fines and penalties inflicted by the courts, if carried out, would defeat entirely the object of the Legislature; a money fine could not be collected, and in case the offender was sent to prison to work it out in the ordinary manner, the persons amongst whom he was placed would run great risk of being infected with the disease—besides, some of the worst diseased are the leaders in all cases of trouble and insubordination—were they sent to prison, no work could be obtained from them, physical inability on their part and compassion on the part of the authorities would forbid such a thing. Legislation on this subject will be submitted for your consideration. A Bill will also be introduced to your notice, imposing a penalty on all persons found in the settlement on any pretence whatever, who cannot show a permit to visit or reside in the place, from the President or Secretary of the Board; this measure is absolutely necessary. At present, a number of men and women pass backwards and forwards between the place and the different islands, setting at defiance all warnings given to them by the Board or its officers, and in many cases, the parties (strange as it may appear) are the paramours of lepers, often of those in the advanced stage of the disease.

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The regular supply of food has given more trouble and anxiety than all others relating to the government of the settlement put together; the valley of Waikolu could and ought to produce kalo in abundance, but these lepers who are comparatively well, in the first stages of the disease only, and who might cultivate it without danger to their lives, if they saw fit, will not do it. Those in whom sloughing of the hands and feet had commenced, as a rule, were the few who showed any industry in the matter, the result being the rapid shortening of their lives, at the same time, that system neither gave a regular supply nor reduced the expenses; those who were industrious and had a yield in their kalo patches, consider themselves entitled to an equal

issue of rations with their lazy and careless companions ; at the same time, the valley was made a resort for many irregular and improper practices, in many cases, with the aid and countenance of the residents at Kalaupapa. This unsatisfactory result determined the Board to order all the lepers into the main settlement, and the kalo lands were transferred to a man not under the control of the Board, in expectation that sufficient kalo would be planted and supplied at a moderate price for the wants of the settlement ; their hopes, however, were not justified, and the majority of the lepers themselves, having petitioned the Board to allow them twenty-five cents per week each in lieu of the supply of kalo, their request was granted, and until lately, their necessities were provided by canoes bringing them sufficient paiai for their wants, from the different valleys on the north side of Molokai. On a sudden, information was received that there was almost a total failure of the staple from that source, and that food must be sent from Honolulu, which was done as soon as a vessel could be procured for that purpose ; before it could arrive, however, some privation had been experienced. The breaking open of the stores occurred on the arrival of the supplies. It is necessary however, to inform you that the lepers are better off under any circumstances, than the people who live at Kalaupapa, they having better supplies of vegetables on hand in their own enclosures, and rations of meat being issued to all, weekly. Arrangements have been made to supply a stated number of bundles of paiai for the next three months at a cost, however, of fifty cents per bundle.

The expenses of the Board are given in Table A. It has been their anxious care to reduce them to as low a scale as possible, conditioned with a due regard to the wants and necessities of those placed under their care. It is worthy of consideration, whether the hospital at Kalihi might not be abolished altogether, or at any rate reduced to a place where suspected persons are merely

retained until the disease has become developed, when they should be immediately sent to the general settlement.

* * * * *

The following letter from Dr. Beratz, (a gentleman who has traveled on the Island of Hawaii for four months and an independent observer) is here inserted as bearing on this subject, the opinions here expressed being in accordance with the views of the Board, on this interesting and important matter.

“ The impression received from various books, before I visited the Hawaiian Islands, in regard to syphilitic diseases among the natives was much changed when, during my stay on the Island of Hawaii I had an opportunity to observe and form an idea of the state of things. I really think that there is not more fresh syphilis to be found among the natives of these islands, than among any other population of the same number in any European or American country. During my trip of four months around the Island of Hawaii, stopping several weeks at the principal places where sick people of all sorts made their appearance, asking for advice and medicine ; I am glad to state that the number of patients afflicted with constitutional syphilis was only a small one.

“ My special attention was also directed to leprosy. Three cases were all that came under my observation, two with the first symptoms of the disease ; the third, in Waimanu Valley, near the large cascade, with all the appearance and affections which we comprehend under the name of leprosy. On this occasion I may state that the same disease is found in different parts of Europe, with the same symptoms in general, and as the medical world has as yet not discovered any satisfactory cure of the disease, a method of separation, similar to that on the Hawaiian Islands, is universally adopted. The patients afflicted with leprosy—in Germany, they call it “ aussatz ;” in Sweden “ spetelska ” —live in hospitals built for that purpose, generally

some miles out of town. For the sake of the other inhabitants of Waimanu Valley, I would recommend the patient to be transferred to the Leper hospital on Molokai.

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Expenditures for the biennial period ending March 31st, 1870.

Leper Asylum, Molokai.....	\$26,883 53
Leper Asylum, Kalihi.....	7,150 22
Total.....	<u>\$34,033 75</u>

REPORT OF THE BOARD OF HEALTH, 1872. FERD. W. HUTCHISON, PRESIDENT.

* * * At the time of the meeting of the Legislative Assembly of 1870, it was hoped by the Board, and so reported by them, that "it was believed that there were then few lepers not under supervision." The Board drew that conclusion from the fact that no new cases from the Island of Oahu, either genuine or doubtful, had come to the knowledge of Dr. Hoffmann, physician to the Kalihi Asylum, for some months, and the reports of medical gentlemen and responsible Government officers from the other Islands gave the same flattering, but, as it proved, deceptive account. It was found that numbers of patients, some in the very last stages of the disease, were secreted away in the valleys which so abound throughout the group, and other obscure but comparatively safe hiding places. This was especially the case on the Island of Oahu, but the discovery of them having been made, the securing of the others was comparatively easy, as the lepers and their friends were in most cases only too anxious to point out the several spots where the others were con-

ceased. It is a surprising thing, but nevertheless most true, that many of the native Hawaiian population appear to be utterly indifferent to the danger which menaces themselves from contact and association with the lepers; it is only in the latter stages of the disease, when the sufferer becomes a loathsome and disgusting looking object, that they appear to be anxious to separate them from their homes—but in the earlier stages they will associate with them readily, wear their clothes (which are generally given up to their friends on their removal to Kalihi,) although death is in the contact, and as a rule will never take warning of the fate—which probably awaits them—from the experience of their neighbors nor from the exhortations of their friends. From the delusive nature of previous information it would be perhaps not well to indulge in strong hopes as to the future, still, the experience of the last few months may, perhaps, authorize the Board to say that, from an examination of many of the cases *now* sent to Honolulu for examination, they are found to be suffering from other cutaneous diseases distinct from leprosy, more especially syphilitic, in their secondary and tertiary forms. It is known, however, that a number of true cases are to be found in the district of Lahaina—which place has been one of the great centres of contagion; but whenever an effort is made to have them sent to Honolulu, their friends get the information and in a very short time it is communicated to all the parties interested; the cane fields make good hiding places, and a search therein becomes useless, more especially when the searchers, as is probable, are not anxious to carry out their instructions.

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During the latter part of Mrs. Walsh's term of office some difficulties occurred—in fact, a partial rebellion took place. The cause of the trouble was a want of appreciation on the part of lepers and lunas† of the

†Luna, Foreman. Luna Makai, Sheriff

duties of their several positions; still, for a time the affair was somewhat serious, anarchy was established—a prompt exhibition of authority—the punishment of two of the ringleaders and the change of the Superintendency to Captain Kahooohuli brought about a result satisfactory to the parties interested, viz: the Government and lepers themselves.

Since the last report a church, in connection with the Hawaiian Evangelical Association, has been erected in the settlement. The Roman Catholic Church is about to build another. Clergymen from both religious bodies visit the members of their flock at regular intervals, and the Board have been much pleased to assist these philanthropic and religious efforts to the best of their ability.

As very few persons, native or foreign, are acquainted with the locality and surroundings of the leper settlement founded by the Government and Legislature of the Hawaiian Kingdom, it may perhaps be well to recall in a succinct form all that has been said and reported to your Honorable body, from time to time, in regard to its situation, surroundings and its actual condition at the present moment.

Let us land on the southern side of Molokai, in the little harbor of Kaunakakai, take horse, ride over the gradually ascending plains in a north-easterly direction to high pasture lands, passing the farm of Mr. Meyer, until we arrive at the edge of the famous precipice of “Kalaupapa,” 2000 feet above the sea level. This precipice we shall have to descend, for it is the only communication by land with “Kalaupapa,” (the landing-place of the settlement from sea). A zigzag road has been cut down this nearly perpendicular pali, which will certainly take an old and accustomed mountaineer nearly one hour to descend. Arrived at its foot, however, and following the trail, we soon arrive at the “Flat” or landing-place, where several native houses are scattered about. On an even, good road, the Leper Settlement is soon arrived at; it is large and extensive,

surrounded by grand and imposing scenery. The papia, puhula and banana plant, give the village a cheerful appearance. Some of the houses are fenced in by stone walls, others are placed amongst potato fields or pasture lands. The view generally is picturesque; vegetation is luxuriant, the scenery is beautiful, and its whole appearance, apart from the lepers themselves, pleasant and agreeable. The first house we arrive at is the dwelling of the Luna Makai; it has a well furnished room, with apartments for stores of various descriptions, to be distributed weekly to the lepers under the rules.

A little further on, the house of the Keeper is reached. He has a neat commodious house with two rooms to himself, the other portions of the house being appropriated for stores of various descriptions, out-office for the supply of medicine, books, etc. The buildings adjoining the principal keeper's house are two hospitals (male and female) for those of the sick unable to attend to themselves—separate houses being provided for all those persons of the leper valley who require special attention in regard to diet, accomodation and medical aid—in fact, for all those too far advanced in the disease to take care of themselves.

In the quadrangle, of which the Superintendent's house forms one side, are to be found the separate houses built for boys and girls, with a special building for a school-room; an instructor for which establishment is generally to be obtained amongst the lepers themselves. There are several other buildings included here, useful or necessary for general purposes and the special control of the stock and material of the establishment.

Care is taken that the patients received here have suitable food, a number of milch cows furnish plenty of milk, morning and evening, and the food is prepared by a Chinese cook (a leper) belonging to the establishment.

The children are taught the ordinary school instruc-

tion of the islands—reading, writing, arithmetic, geography and singing.

The scene presented to a stranger on visiting these school-rooms must necessarily be a sad one, yet he cannot but reflect that it is well for the country and the whole race that these young people,—poisoned in their blood,—are taken away from the community at large. The children, with the exception of one or two, do not seem to feel their misfortune; when they leave school they act as others of the same age, running or playing their way home, apparently unconscious of the fate that awaits them.

A little distance from this central place, nearer the seaside, a little church has been built, where every Sunday a native minister, a leper himself, holds a service. It is situated on a spacious grassy ground, the rays of the sun being tempered by the cool, refreshing northerly breezes. It is well attended by the poor people for whose benefit it has been specially erected.

The houses of the lepers are scattered throughout the valley. There is a stream at the head of the settlement, and a visitor will meet numbers of lepers on, an ordinary fine day, some leading horses, carrying bundles of clothes in the direction of the stream; others carrying calabashes of poi, sweet-potatoes, &c.,—in fact, the ordinary life of a Hawaiian village will be seen there in its usual routine and manners.

The houses are generally well kept and clean, (much to the credit of the lepers themselves and the lunas placed over them.) Included in the number of lepers are several half-castes, two or three Chinamen, and one European. The females are admirably industrious, making mats and other material for the internal comfort and accommodation of their cottages. The males who are able and willing to do something, work their potato fields, raise sugar cane, bananas, &c. A great change for the better has taken place amongst them during the past two years. They now raise considerable quantities of food, which supplements the sur

plies granted by the Board ; at the same time, they still *claim* equality for all, that is to say, that the able-bodied shall have the same supply issued to them as is granted to those who have lost hands, feet, and in every other respect are reduced to the necessity of having others supply their wants or dying from starvation. This evil however is gradually correcting itself.

Fresh provisions only, are issued to the lepers—five pounds of meat and twenty-one pounds of paiai per week are the ordinary rations issued from the Superintendent's Department. The meat generally is mutton, but this is varied at times by fresh beef—the product of the herd belonging to the Board, which is gradually increasing, and may be expected at no very distant day to reduce the sum now annually paid for sheep supplied to the Establishment. The ration is a large one, and exceeds that issued to the soldiers of the best supplied European and American Armies, nevertheless the complaint is chronic at Molokai as well as at Kalihi that sufficient food is not supplied to the patients. The Board, however, can fairly assert that these people are better supplied than they ever were in their own homes—a proof of the assertion may be found in the fact that many of the people living at the landing place at Kalau-papa have been anxious to make themselves lepers, and probably the whole population of that hamlet would not object to be taken under the supervision of the Board. Whoever has had experience traveling around these islands must know that there are places where the people have nothing to eat but a little poi, or a sweet potato, with a little kukui nut and salt to make a relish for the comparatively insipid food.

Whatever these people raise has been recognized as their own, with liberty to dispose of it as they like—and they have frequently sold of their produce quantities of sweet potatoes and numbers of pigs. It is well to put these facts on record for the better information of those who have sometimes been misled by story-tellers, occasionally tinged with a certain animosity against the Institution.

Some marriages have taken place among the lepers, sterility is the almost universal result—and it is fortunate that such is the case. Within the five years existence of the Institution, and in a population of several hundred people, only two births have been reported. The first case was born dead, the other is living now, borne by a woman who shows no signs of leprosy, but her husband, with whom she lives, is a perfect leper. Some doubts have been expressed about the paternity of this child. Leprosy is more common amongst males than females; two-thirds of the lepers in Kalaupapa Valley are males and one-third females. This fact may seem strange at first, more especially to those who have given no attention to the several conditions under which the disease is or may be propagated, but the subject would require a pamphlet in itself to elucidate it even partially. Suffice it to say here, that a female suffering from the disease is more apt to transmit the poison than the male; it would even appear that they may show no symptoms themselves, yet infect their husbands time and time again. Several instances are known on these islands where women have married the second and third husband, after the first had died of leprosy, and their later partners, after a short time, shared the fate of the first.

The marks of former syphilitic disease—deformity in the face or other parts of the body—are very frequent with a great number of the patients. Signs of hereditary syphilis appear in the poor children. It is therefore not unlikely that that disease is one of the predisposing causes of leprosy. Painful observation leaves little doubt that in some families the leprosy of the young generation had its root in an inveterate constitutional venereal taint derived from the parents or grandparents.

The subject is an interesting one to medical men, but to the majority of the public a disagreeable one; it may be added, however, that more leprosy exists at those places on the islands which were most famous for their immorality in former days.

The question is still asked at times: "Is the disease contagious?" We most emphatically say, yes! Daily experience confirms this. Whole families, and those who have lived with them, member by member, becoming diseased; such being the nature of the disease, it is a terrible sight to see sometimes, on entering a native house, a leper, some relative or friend of the family, sitting among little children, and perhaps eating with them out of the same calabash, with sores on the fingers and poisonous breath. The lives of half a dozen persons are endangered by the aloha to one person who should already be considered lost. It is a poor way of showing love to other members of the family by assisting to keep such a person in the family. Still, it is done in many cases, and every obstacle is thrown in the way of the authorities when endeavoring to secure the isolation of the diseased man or woman.

We repeat again here that these people are well taken care of, and by no means unhappy.

Let us think for a moment and imagine what a state we should be in, if all these lepers, instead of living together at Kalaupapa, were running free and scattered around the islands, in the towns and villages, settlements and families. We could not go anywhere without meeting a leper; there would be hardly a valley on the islands without having lepers among its population. The consequence must ultimately be the ruin of the Hawaiian race, and the foreigner would soon be included in the catastrophe. But that would not be all, strangers not used to such sights would receive evil impressions; the opinions of foreign countries would be very different in regard to us to what they are now. The islands would be shunned on all occasions, and no vessel or stranger would enter our ports unless forced by sheer necessity, and would make their escape as quickly as possible. The conclusion to be drawn from this is that although the cost connected with the establishment is large, yet it is a matter of absolute necessity that it be continued, and the money so spent may well

be looked upon as an encouragement to the trade, agriculture and enterprise of the islands.

In Europe the lepers are collected in large asylums, in fact, prisons, many stories high, and surrounded by high stone walls. The strictest seclusion is enforced between the inhabitants of these asylums and other people, and we do not hesitate to say that the settlement of Kalaupapa will compare favorably with any institution of the kind in the world. * * *

* * * The Board have to regret the loss of Dr. Beratz—drowned accidentally in the District of Hana; he had proved himself a faithful and competent physician, was beloved by the native population and appreciated by foreigners generally. His place will be difficult to fill—the qualifications thereto being somewhat peculiar and not easily found in this community.
* * * * *

Expenditures for the biennial period, ending March 31, 1878:

Leper establishment, Molokai.....	\$26,055.11
Leper Asylum, Kalihi	5,673.01
	<hr/>
	\$31,728.12

DR. TROUSSEAU'S VIEWS ON THE LEPROSY.

[P. C. Advertiser, July 8, 1873.]

Mr. Editor:—I have been frequently asked by some friends to write some information or other about leprosy, and the action of the Board of Health.

We always thought the least talk about it the better; action was needed in presence of the alarming spread of the disease of late years. I will explain what the action of the Board has been now that the painful part of its duties is almost at a close.

How sad these duties have been, my colleagues and myself only know. The influences brought to bear upon us have been numerous. Prayers, threats and worse have been resorted to. We may boldly say that no consideration of fortune, rank or nationality has arrested us, and our task has been achieved to the best of our ability.

Many a time our hearts were bleeding. I, for myself, as a medical man, have been far from coming in contact with the pleasantest features of humanity; well, I never in my life had to witness more painful scenes of physical and mental suffering.

On the whole, the natives have behaved very well. The poor lepers have shown courage, as have their friends also, but the amount of concealed sufferings left behind by the energetic measures of the Board, God only knows. Let natives and foreigners know we have had a full share of sorrow. We must also render full justice to His Majesty. Not in one case has he tried to interfere with the action of the Board, even if a friend or a relative had to be sent away.

Since the first of March, I have examined over one thousand people. Four hundred and ten cases have been sent to Molokai, two hundred and forty men and one hundred and seventy women, all natives and half whites, with the exception of six foreigners, one American, one Frenchman, one Englishmen, and three Chinamen. In no case, has a relative or friend been allowed to follow the leper.

The number on Molokai is now about 800, say a little over two per cent of the population.

We may positively declare that by this time there are not over fifty cases at large in the Hawaiian kingdom. They will be gradually discovered. Some cases are sure to make their appearance for the next few years, but we hope that if we do not thoroughly eradicate the disease, we shall keep it under such control that it will cease to be a cause of depopulation. Now allow me a few remarks about the disease.

Is leprosy infectious or even contagious in the sense of the word ; that is, by contact mere and simple? I emphatically say no.

I am supported in that opinion by the whole medical world, and by personal experience.

Leprosy cannot be communicated like cholera, yellow fever, small-pox or typhoid fever.

But provided there is a predisposition in a person, that person may contract the disease by various means, —cohabitation, smoking out of the same pipe, eating or drinking with the leper, and so forth.

Therefore, there is no danger for the foreign population, and the spread of the disease of late years should not destroy in any way the universal reputation of our most healthy climate. As far as the native race is concerned, it is quite different.

The promiscuous habits of the natives, and their renowned hospitality are such that they are pretty sure to catch the least contagious of diseases.

Isolation, and *thorough* isolation, as the Board understands it, and is carrying it out, will be one of the most efficient means of arresting the progress of the disease.

The most obvious predisposing causes are: syphilis and its nearest cousin scrofula, also hereditary. A want of variety in the diet ; mostly the use of salt provisions, habitation in ill ventilated or dark houses may also be blamed. The foreigner as a rule is not exposed to such influences, or rather to a less degree than the natives.

In fact, leprosy is not only a skin disease, it is what we call in medical parlance a *cachexia*. This means a debilitated state of the blood, under a morbid influence.

Syphilis, scrofula, intermittent fever generate also that peculiar state of the blood which produces *cachexia*. Persons already suffering from one *cachexia* will be more liable to suffer from any other.

I always abstained heretofore from expressing my personal views on the subject, but I am confident they will be shared by those who have in the study of the

disease gone beyond the range of superficial observation. The public health as far as foreigners are concerned is perfectly safe.

To conclude, I will state that a great deal has to be done yet. The Board will have to devise preventive and sanitary measures, without which the disease would not be eradicated.

Also impress upon the natives a salutary dread of the disease, so that no case should be concealed.

Use the utmost exertion to rescue those cases in Molokai who might perhaps not be beyond recovery.

A great deal has been written lately in the local papers about the treatment of leprosy. As the medical man of the Board, I consider it my duty to give a general answer.

If incipient cases can be cured,—and my impression is that they may in some cases,—let the public well understand that nothing will be neglected.

The treatment at all events, must last for months, or even years, and could not be carried out before isolation was completed.

It will have to be discussed with my brother practitioners in Honolulu, and will be openly and faithfully executed.

The medical world is sufficiently well represented in Honolulu by men of all nationalities, without any necessity for us to seek for foreign assistance. Any medical man who respects himself will never say, “I will cure leprosy under the tropics.” He will say, “I *may* cure it,” and then he will use known remedies and expose his plan of treatment.

I say, in full confidence, that what the combined efforts of the medical men in Honolulu will not do, need not be tried by anybody else. I, for my own share, have little confidence in those who either offer to sell their secrets, or require inducements, without which we are willing to try our best.

I thank you, Mr. Editor, for the valuable space you

have been kind enough to allow me to take up in your paper.

Believe me to be yours, most obediently,

G. TROUSSEAU,
Physician of the Board of Health.

P. S.—I beg to apologize to the readers for any imperfection in the language. My excuse will be my nationality.

Honolulu, July 8, 1873.

EXTRACT FROM RECORDS OF BOARD OF HEALTH,
MARCH 1, 1873.

A discussion ensued with regard to the possible extermination of the disease, Dr. Trousseau strongly urging that the only method, at all likely to be successful, was the immediate, energetic, and to a certain extent, unsympathetic isolation of all who were afflicted with the disease, and even that would require a generation in all probability to prove successful. It was reported that 115 kokuas, or helpers, were at present at the asylum who were not lepers, and yet were virtually supported by the Board of Health.

REPORT OF THE BOARD OF HEALTH FOR 1874, HER-
MANN A. WIDEMANN, PRESIDENT.*

In 1865 the Legislature passed an Act to prevent the spread of leprosy. Ever since the Act has been in force the Board of Health has done its best to seclude the lepers, as ordered by the Legislature. The Admin-

* First year of the reign of His present Majesty King Kalakaua.

istration appointed by His late lamented Majesty Lunailo I., was strongly urged by public opinion not only to carry on the measures of their predecessors, but also to use their best efforts and carry out to its full extent the law of 1865.

After enquiries made in the beginning of 1873, it was ascertained that at least four hundred confirmed lepers were mixing amongst the healthy part of the population, all over the islands, the most contaminated centers being Honolulu and Lahaina. According to the spirit of the law, that you yourselves have made as stringent as possible, the Board of Health commenced its work, and from the beginning of 1873, to the present date, have had to send over five hundred confirmed lepers to Molokai. The members of the Board are under the impression that unless the law be carried out thoroughly, it will fail to effect the object intended by the Legislature, viz: the arrest of the most frightful disease known. It must also be the opinion of every one that half-measures only cause an enormous amount of expense, and bring no result.

You must be informed that the duties of the Board of Health with regard to the lepers have been most arduous and heartrending. They have been fulfilled with a stern feeling of responsibility, without any consideration of person or rank, and only in obedience to a necessary law, at the cost of much fatigue, annoyance, and even personal risk. The feelings of the Board are with our unfortunate isolated lepers and their families; but what is to be done except trying to make them as comfortable as circumstances will permit? Have we not principally to look to the healthier part of the population, who, ignorant of the danger, allow themselves and their children to be contaminated forever? Seclusion is ordered by law; seclusion is the only way which in olden times, as well as in our own days, has been found to be of any use in arresting the progress of the disease, or even in eradicating it. Seclusion, and strict seclusion, has to be maintained if you want to save the balance of

the Hawaiian race. The Board has effected this to the best of its ability. Some more lepers are known to us about the islands. As soon as you will have enabled us to support them, they will be gathered together and sent to Molokai to join their fellow-sufferers. This done, there will only be now and then a few cases making their appearance, and the disease will be kept in check, until time, improvements of habits, diet and general measures of hygiene put a final stop to it, as we are in hopes they will.

The gathering together of the lepers was not the only trouble. The most difficult point has been to give them ample accommodations in Kalawao, and to provide for their own wants. For this the Board had to rely on its own resources. On a visit made by two members of the Board early in 1873, it was ascertained that the building accommodations in Kalawao were inadequate to the wants of the increasing population; also a large number of healthy natives in Kalaupapa had retained possession of kuleanas* on the Board of Health's land, with numerous good houses. The Board came to the conclusion that if these kuleanas could be bought out at a reasonable price it would answer two purposes: *First*, Building accommodation. *Second*, A stricter isolation of the lepers. Mr. Meyer, the Board's agent in Molokai, managed to carry out the almost complete purchase of the kuleanas, to the satisfaction of the owners and of the Board of health.

* * * * *

The settlement, or rather the hospitals, stores and central buildings were without water accommodation. The board undertook to lay down a pipe, six thousand feet in length, with taps at convenient distances, and by this time a constant supply of good fresh water runs by the hospital, to the benefit of the leper population. A store to supply many little private wants of the lepers was asked for by the community at Kalawao. It has

* Kuleana—A plot of land held in fee.

been established on a self-supporting basis. The lepers can buy goods in the store at cost price, increased only by a small percentage to cover the expenses of carriage and store-keeper's salary. It has hitherto, and will continue to pay its own expenses. It is solely an accommodation for the lepers.

The Board had next to provide for the daily wants of the increased community. This was certainly a more pleasant task, but by no means less difficult. Eight hundred people had to be supplied with food, and this has been the daily pre-occupation of the members of the Board. The rations fixed by the previous Administration had to be maintained. Every leper receives per week twenty-one pounds of paiai and five to six pounds of beef, or when on account of difficulties well known to those acquainted with the place, the provisions of beef and paiai cannot be landed, the Board keeps in store a considerable supply of salmon and rice, and the rations then consist of nine pounds of rice, one pound of sugar and three to four pounds of salmon per week. It has been impossible to get any cattle down by the pali, so that all the year we have been depending on beef per sailing vessels and the "Kilauea."

Notwithstanding the increased number of lepers, the difficulties of communication, etc., there has not been one instance of want of food at the settlement. * * * However, complaint is made on Molokai as well as at Kalihi, that sufficient food is not supplied to the patients. The Board can assert that in a material point of view, these people are better off in Molokai than most natives of these islands, and also better off, with very few exceptions, than they ever were in their own homes.

A very important measure has been started by the Board, tending to make in time the establishment almost self-supporting as far as paiai is concerned. Under the intelligent direction of the present luna, W. P. Ragsdale, a number of natives, old residents among the lepers, and whom the Board thought wise to keep as

kokuas, have entered into a contract for the cultivation of kalo on half shares in the Waikolu Valley. One-half of the kalo cultivated by them has to be converted into paiai, and belongs to the Board; the other half belongs to these natives, and they sell it to the Board in form of paiai at the rate of twenty-five cents per bundle. There is some difficulty to make them adhere to the contract, but the energy of Mr. Ragsdale will probably overcome the difficulty. The intention of the Board is also to raise stock on the lands belonging to it, so that a constant supply of beef should always be on hand.

A large number of kalo patches have been planted, and are now promising a fine crop. In a few months the Board will begin to reap the benefit of such an important enterprise. It will also secure a much more regular supply of food to the lepers. The usual supplies of clothing have also been delivered to the lepers, so that in all respects they have been made as comfortable as possible. Two members of the Board have paid regular visits to the settlement, and have never found any dissatisfaction among the people, or any foundation to their generally most frivolous complaints.

The lepers, like other people, are subject to ordinary ailments. These had been hitherto almost entirely neglected. The physician of the Board, to his great sorrow unable to cure the disease, has paid the greatest attention to their ordinary ailments and to the relief of their miserable condition. Mr. Williamson, late superintendent at Kalihi, a white man, and himself a leper, has been appointed by the Board, as overseer of the hospital and in charge of the medicines. He constantly receives medicines and instructions from the physician of the Board, and applies them to the great satisfaction of all parties. Meanwhile the Board of Health is receiving constant information from all parts of the world on the treatment of leprosy. Experiments are carried on constantly on patients at Kalihi, and on very incipient, or rather doubtful cases, at their own homes,

Though some patients have certainly improved a great deal under careful treatment, we cannot for the present state any one case of cure. All those reported as having been cured by native or Chinese doctors had been examined and dismissed as non-lepers. The highest science of the world, after continuous and arduous study, knows yet very little about leprosy. Is it likely that perfect strangers to the art of medicine would succeed where the princes of the art have unfortunately constantly failed? Notwithstanding these discouraging facts, the Board will continue to be regularly informed of the progress of medical science in connection with leprosy, and will never fail to give the fairest chance to any reasonable treatment.

Mr. W. P. Ragsdale,* who some months ago gave a remarkable example of self sacrifice in going of his own accord to Molokai, is the present superintendent of the Asylum. A more active and efficient man could hardly be found. The Board declares to your Honorable Body that Mr. Ragsdale deserves the highest praise for the manner in which he accomplishes his difficult task.

* * * * *

The last census has shown a steady decrease of the population since 1866. The Board of Health does not neglect to investigate, as thoroughly as possible, the causes of depopulation. Some of them ought to be considered, and the most important of all is the existence of syphilis. You have, in 1860, passed a law called "The Law to Mitigate;" it is the intention of the Board of Health to advise the new Administration, appointed by King Kalakaua, to enforce the existing law, and to test if the proper working of it will not reduce the number of natives suffering from syphilis. The traveling physicians on the different islands, and the physicians in Honolulu practising among natives, report that the disease is on the increase. Syphilis may be considered as the most important cause of the de-

* A half white, who died a leper, at Molokai.

population of these islands, and also one of the most predisposing cause to leprosy. If after two years' experience the law proves insufficient, it will be the duty of the Board of Health to propose to your Honorable Body some new regulations.

Amongst the other causes of depopulation are some that moral influence only can counteract. It lays with the more enlightened class of Hawaiians, with the foreigners mixing with the natives, and with all church members to impress upon the more ignorant classes the importance of chastity in young girls, of better morals in later life, of the moderate use of awa, and the danger of the use of opium and intoxicating drinks. No regulations, we think, can do much against those evils, all of which tend more or less to unfruitful marriages.

* * * * *

Expenditures for the biennial period ending March 31st, 1874.

Leper Establishment, Molokai.....	\$56,565.24
Leper Asylum, Kalihi.....	6,872.52
Total.....	<u>\$63,437.76</u>

STATEMENT ON LEPROSY AND RESOLUTIONS ADOPTED
BY THE HAWAIIAN EVANGELICAL ASSOCIATION,
HONOLULU, JUNE 10, 1873.

The disease of leprosy in these islands has assumed such an aspect that it becomes our immediate duty to determine our course of action as pastors and teachers respecting it.

This loathsome, incurable and deadly disease has fastened upon the vitals of the nation. Although we hope and believe that it is not yet too late, by the use

of sufficiently stern and vigorous measures, to dislodge its fatal hold, that hold has become fearfully strong. The numbers already known to be victims to leprosy, the still larger numbers who are undoubtedly infected, the steady, remorseless activity with which it is extending, all tell us, with ghastly assurance, that unless remedial measures are used more effective than have been hitherto applied, our Hawaiian people will become a *nation of lepers*.

* * * * *

Our great peril is from general ignorance on this subject among the common people, and from their consequent apathy and perversity. They refuse to separate their lepers from them. They eat, drink and sleep with them. They oppose their removal and hide them. They listen to the voices of evil-minded men who raise an outcry against the King and his helpers, when they strive to root out the evil thing.

* * * * *

Therefore, *Resolved*, That every pastor and preacher of this Association, be instructed to preach frequently and particularly to his people upon the duty of isolating their lepers, especially as illustrated by the Mosaic law in the thirteenth chapter of Leviticus; also that he diligently use his personal efforts to lead the people in this duty.

Resolved, to set apart the 18th day of July next, as a day of fasting, of repentance before God for our sins, and especially for those sins which promote the spread of this disease, and also as a day of Prayer to God to strengthen the King and the officers of the Government in cleansing the land of this disease, and to turn the hearts of the people to help in this work of saving the nation.

Signed by Titus Coan, D. B. Lyman, W. P. Alexander, S. E. Bishop, J. P. Green, A. O. Forbes and about forty Hawaiians.

REPORT OF THE BOARD OF HEALTH, FOR 1876, SAM'L.
G. WILDER, PRESIDENT.

Sir:—As required by law, the Board of Health make to the Minister of the Interior the following report :

The Legislature of 1874 made an appropriation of six thousand dollars, expenses of Drs. Powell and Akana, for curing the leprosy. These parties were offered every facility to try their skill and prove their ability to make good their assertions. On the part of Dr. Powell, the President of the Board received an insulting letter. He, the so-called doctor, declining to make any trial and he soon after left the country.

The Chinese doctor accepted the offer of the Board, and was, at the expense of the Board, sent to Kalawao. Six patients were placed in his care and for six months he gave them medicines, at which time Dr. Akana claimed to have cured one of the six; the patient was brought to Honolulu, examined by a number of physicians, and returned to Kalawao as a confirmed leper. This ended Dr. Akana's attempt to cure leprosy.

Upon careful consideration the Board decided that the keeping up of Kalihi Hospital was not advisable; the situation was such that isolation of the afflicted was impossible; that all attempts to cure any patient afflicted with leprosy had failed; that all parties afflicted with leprosy should at once be sent to Molokai; to this end a suitable building adjoining the Station House has been erected, where the sick are retained until the physicians decide they are lepers or not.

This arrangement reduced considerably the expenses of the Board.

Report of the lepers admitted to Leper Asylum, Molokai, from January 6, 1866, to March 31, 1876, (ten years) :

Males.....	991
Females, including children	579
	— 1570

Total Deaths from January 6, 1866, to March 31, 1876;

Males.....	569	
Females, including children	308	
	—	872

Total Number of Lepers, living March 31, 1876:

Males.....	422	
Females, including children	276	
	—	698

Included in the above total number of admissions were 18 foreigners, as follows:

2 Germans, 2 Americans, 1 Englishman, 1 native of Mauritius, 12 Chinamen,—11 males and 1 female.

From the above number there have died: 4 Chinamen, 2 Germans, 1 Englishman, 1 American.

Living at this day: 8 Chinamen,—7 males and 1 female; 1 American, 1 native of Mauritius.

The Board are not prepared to advance any new ideas or theories as to the cure of leprosy, at the same time they feel assured that the disease is under control; and that another two years of active action like the past will have isolated the afflicted and checked the disease.

* * * * *

This law (the Act to Mitigate) is not directly under the supervision of the Board, and we would recommend Your Excellency that the law should be so changed as to be placed directly under the control of the Board of Health, and otherwise amended that no party should be imprisoned except by the authority of some Court. The Board are firmly of the opinion that in the carrying out of this law, depends the checking of leprosy.

* * * * *

During the two years past there has not arisen any trouble at Kalawao; there has been at all times sufficient food. The Board have not on file a single complaint made by any of the sick. * * *

The Board are confident that the number of patients at Kalawao will now decrease; that no extraordinary expenses are expected; that the supply of taro and cat-tle is such that we can safely figure for a lessened ex-

penditure than for the past two years; no more houses will be necessary; the number now owned by the Board give to *all* comfortable houses.*

REPORT OF THE BOARD OF HEALTH, FOR 1878, J. MOTT SMITH, PRESIDENT.

This settlement, which was established in 1866 for the segregation of the unfortunate victims of this incurable disease, remains still a necessity for the nation. The Board has endeavored for the past two years to carry out the laws regarding the lepers with fidelity, and, however harsh it may appear in individual cases, there exist sufficient reasons to persevere in the measures which have been hitherto pursued. The public health, as well as public policy, demand continued effort in this direction, and the Board therefore ask for the appropriation necessary for the purpose.

* * * * *

The number of lepers living at Kalawao, April 1, 1878, under care of the Government is 692.

The great rise in the price of beef, poi, rice and other articles of food furnished to the people of the settlement during the past year, has made it difficult to keep the expenses within the appropriation. Prices are not likely to abate in the coming two years, yet the Board hopes to maintain the asylum at about the same cost as heretofore, and therefore has not asked for any increase of the appropriation.

The Board spare no pains in looking after the well-being of the lepers and in providing for their wants. It may be affirmed that the settlement is truly a refuge for the diseased and distressed, and that they are there,

* Frame houses, big and small, 129; Grass houses, big and small, 171. There are 5 or 6 from the above lot belonging to private parties.

more comfortably situated than they can be elsewhere. They are wards of the Government, have food, raiment, lodging and medicines provided to them, and are not dependent upon perhaps unwilling or poor friends or neighbors, to whom they have become a burden or perhaps objects of fear.

An effort was made, some months since, by the Board, to secure the residence of a physician at the settlement. An arrangement was entered into, but it was broken off, and up to this time no medical man has been found willing to go and reside there.

The death of the local superintendent, Wm. P. Ragsdale, in February last, deprived the Board of an officer whose management of the settlement contributed greatly to the order and quiet which has become established there.

Expenditures for the biennial period ending March 31, 1878:

Leper Settlement	\$59,674.62
Less net sales of hide, tallow, etc	2,140.29
	<hr/>
	\$57,534.33

REPORT OF THE SPECIAL SANITARY COMMITTEE ON
THE STATE OF THE LEPER SETTLEMENT AT KALAWAO,
1878, WALTER M. GIBSON, CHAIRMAN.

To the Honorable G. Rhodes, President of the Legislative Assembly:

Your Special Committee appointed by the Honorable Assembly to enquire into the working of the Acts constituting the Board of Health, and for the prevention of the spread of leprosy, beg to submit a report of their visit to the leper settlement at Kalawao.

The lepers of the Kalawao Settlement were assembled at Kalaupapa in large numbers, and greeted the committee in a kindly and impressive manner. The chairman, Walter M. Gibson, and members of the Committee addressed the unfortunate people stating the object of the visit, to obtain fuller and more precise information for the Legislative Assembly and for the nation in regard to their condition, with a view to measures of amelioration if needed.

A gift of one hundred dollars from Her Majesty the Queen Dowager was placed by the Chairman in the hands of Rev. Father Damien to be distributed according to his judgment among the most needy of the lepers.

After a short enquiry it was deemed best to carry on the investigation at the Kalawao Hospital; and your Committee and physicians in company, being provided with horses, rode to the hospital, distant about three miles from the Kalaupapa landing.

At the hospital there were assembled several hundred lepers, and they were distinctly and repeatedly invited, as had been done at Kalaupapa, to make complaint of any grievances they suffered under,—and it was announced by the Committee, that if any one felt that he or she was wrongfully detained in the settlement as a leper, such person was invited to come forward and be examined by the accompanying physicians,—being assured of the protection and kindly disposition of the Committee.

Your Committee listened patiently to the complaints and statements of over thirty lepers, and append herewith a verbatim report of their several wants and grievances. They visited the wards of the hospital. They examined the dwellings and manner of living of lepers residing outside the hospital. They visited and made enquiries at the settlement store. They were present during the butchering of animals in the slaughter-house. They witnessed the digging of a grave by lepers, and the burial of a leper. They noticed the animals of the set-

tlement, and in fine observed in a stay of nearly two days, as far as it was possible, every particular relating to the condition of the lepers, and the administration of the Board of Health at Kalawao, and the Committee present as the result of their observations the following statements and recommendations.

The situation of Kalawao settlement seems very desirable. A table land or bench, with an area of about 8 square miles, and an elevation of 100 feet, is bounded on one side by the ocean, and landward by a stupendous and almost insurmountable wall of bold bluffs, rising at the pass to the height of 2,000 feet above the sea. This lofty back-ground of the settlement arrests the trade wind clouds, and causes a frequency of showers, and a luxuriance of verdure, even upon the rocks in the sea, such as is hardly witnessed at any other points along the coast of the islands. Therefore Kalawao presents scenery of great natural beauty, and would be regarded anywhere as an attractive place of residence.

However, your Committee will observe here, that this beauty and verdure is associated with a great deal of moist atmosphere, and makes it only the more important that habitations, especially for invalids, should afford a complete shelter against any inclemency of weather. Of the houses visited by your Committee, many were commodious and well built of lumber, and equal to the average tenement constructed by Hawaiians on their own lands; but a large number are too small and of too light construction to afford a proper shelter. In a hut 10ft. by 8ft., visited by your Committee, four lepers made their home. This hut was constructed of hala or pandanus stems, leaned to against one another, merely forming a roof without walls, which was covered with a thatch of partly ferns and sugar cane blades. Such a covering must be, as was stated, pervious to the winds and rains,—and it is the opinion of the Committee that patients who cannot, or will not provide a better shelter for themselves, should be pro-

vided with lodging in Hospital grounds under the immediate supervision of the superintendent of the settlement.

It is proper to state here, that of 690 patients now residing on Kalawao lands, not more than sixty are cared for within Hospital grounds, and the main body of 630 lepers live in cabins or huts, chiefly built by themselves, of material which they have purchased and shipped to the Settlement; and it is to be observed that the lepers have only consulted their own fancies or tastes in the selection of situations or construction of dwellings; so that, whilst some are well situated and commodious, others are entirely too small, badly constructed, and in unfavorable situations. Farthermore, in many huts not a sufficiency of matting was found. Not more than two, and in some cases only one mat, separated the invalid from the hardness of a board floor, or the dampness of a dirt floor.

As much complaint was made by lepers in respect to insufficiency of food, your Committee gave especial attention to this matter. They understood from the assistant superintendent, Rev. Damien, that the regulation supply of food, is one bundle of taro, to weigh twenty-one pounds, along with six pounds of beef, for one week. The committee saw some bundles of taro which weighed fully twenty-one pounds;—but it must be observed that this was the wrapping of ki leaves;—and as the bundle of taro prepared and sold by Hawaiians, varies, as is well known in weight; it may be, as stated by Keoni Kaahaihanu, one of the lepers, that sometimes the bundle of taro only weighed about sixteen pounds, and when divested of three or four pounds of ki leaves, will leave only twelve or thirteen pounds of taro, which would not be sufficient food for a Hawaiian with an ordinary appetite. J. H. Napela, once acting superintendent, said that bundles often fell short of weight. And your Committee are of opinion that six pounds of beef, as cut by the butcher, with a certain proportion of bone, is rather a scant supply of animal food

for one individual for one week. The supplementary articles of food, rice and bread, which are furnished in case of interruption of supply of taro, were examined and found to be of good quality. The assistant superintendent Damien stated that either nine pounds of rice or seven pounds of hard bread, was furnished as a week's ration in the stead of taro.

In respect to the clothing of lepers, your Committee were informed by several lepers, and among others, by Superintendent Sumner, that the annual allowance was a "clothing ration," or order for \$5.75, supplied at the leper store, which is under the management of the agent of the Board of Health. Your Committee visited the store, and enquired into prices of articles most needed by the lepers, and quote as follows:

Best denims, per yard.....	40 cents
Denims, inferior quality.....	30 "
Brown Cotton	15 "
Prints	18 to 20 "
Tobacco per pound.....	50 "
Soap per bar	25 "
Matches per bunch.....	25 "

Whilst some of these prices are fair retail rates, others are very high, especially of staple articles most needed by lepers; and it is the opinion of your Committee that the clothing ration of \$5.75, can furnish at these prices, only a very scant annual allowance of clothing; and they are furthermore of the opinion that the clothing ration of lepers should be procured for them at wholesale rates, and the Government provide for the expenses incidental to purchase, freight and distribution. According to the Report of Board of Health, lepers were provided with clothing during the late biennial period to the amount of \$9,862.32, which amount must be largely in excess of cost.

Among the complaints laid before your Committee, it was stated that neither lamp oil, soap, or salt were furnished gratuitously to the lepers of the settlement, and that all these articles had to be purchased with their own money at the settlement store. Complaint also

was made that neither bucket or bowl, nor culinary vessel or utensil of any kind was furnished to the lepers; and your Committee observed at the hospital a notable deficiency in respect to bathing vessels, as only three medium sized bathing tubs were provided for the use of about sixty patients, usually in a filthy and excoriated condition. But in this connection your Committee are pleased to mention that plenty of good water is supplied by pipes, and that there are many hydrants or taps in convenient places for the distribution of water throughout the settlement, and at the hospital buildings.

Your Committee gladly notice the salubrious situation of the hospital grounds at an elevation of about one hundred feet above the level of the sea; and noticed that the several wards for the very sick, and the storerooms were kept in proper order. But your Committee regret at the same time to notice the small supply of bedding or clothing of confined lepers, as some showed to your Committee a tattered remnant of a blanket as the only covering. And in the hospital dispensary there was no adequate supply of medicines for such an assemblage of sick people, and no suitable liniments or disinfectants; nor a strip of lint to help cleanse or bandage the sores of the sufferers.

During the stay of your Committee at the settlement, a leper died and was buried. Your Committee observed the digging of the grave in this instance, and noted as stated by Kaapu and other witnesses that lepers in a very crippled state were obliged to dig graves. Kaapu, took part in this work, had lost several joints of his fingers, as will be seen in photograph No. 10, and the others who assisted him were equally unfit for work of this kind. Yet as stated by Kaluakini, and others, if any leper refused to dig a grave when called upon, he was denied his weekly ration of food. In this connection your Committee were informed as stated by Puna, and others, that lepers have to pay for their own coffins, and have formed a coffin association in order to provide a common fund for their proper interment; and these

sad creatures get up as shown by the register of the hospital, "coffin feasts," on which occasion money is contributed to provide for a decent termination of their woes.

Assistant Superintendent, Rev. Damien, stated that two dollars was the price of a rough board coffin, and that many deceased lepers, who had not left behind them this amount of worldly goods, were buried without a coffin, and in one instance he had witnessed at Kalawao portions of a corpse rooted up out of a shallow grave, and devoured by hogs. At the present time, the Reverend Father has a large burial ground adjoining his church well enclosed, in which deceased lepers, whether of his communion or not, are decently buried.

In respect to the deceased lepers, your Committee were informed by Keoni Kaahaihanu and Superintendent Sumner, that in case of effects of deceased, if of a value not exceeding five dollars, were presented to friends of or attendants upon a dead leper; but if above the value of five dollars, the effects were sold at auction in the settlement, and the proceeds were forwarded to the agent of the Board of Health to be transmitted to the heirs at law. Many small estates of lepers had thus been forwarded. The lepers at the settlement urged upon the attention of your committee, that inasmuch as they were regarded as civilly dead, and entirely cut off from their former homes and people, that the immediate friends of and attendants upon a deceased leper should possess the effects left behind; whether large or small.

The lepers complained to your Committee that there was no proper administration of law in the settlement. They complained of the arbitrary proceedings of the present, and of a former superintendent;—such as confining a leper with ball and chain, for no other offense than running or attempting to run away, or confining with irons for small offenses or breaches of the peace; or enforcing labor and imposing fines and penalties for

non compliances. In this matter, your Committee are of opinion, that a body of people, brought together like this unfortunate community must needs be subject to an authority with discretionary powers, but all the circumstances warrant them in saying and recommending that this authority, if possible, should only be vested in the hands of a kind and able administrator of large experience, who should also be a physician of repute.

A large-minded, philanthropic, energetic, professional superintendent or governor is the great want and necessity of the unfortunate community at Kalawao. Superintendent Sumner, a feeble and unhappy leper himself, is utterly inadequate. Assistant Superintendent Damien is a devoted and heroic priest, who has voluntarily sacrificed his young life for the welfare of the lepers. But his spiritual duties necessarily engross the larger portion of his attention; and it would seem to be a pity to impose the details of secular work upon such a man, and interrupt his holy work of mercy in consoling his wretched parish. Therefore your Committee express the hope, that such provision will be made by the Government, and such inducements will be offered, as will ultimately result in securing the valuable services of the superior and skilled official now needed at Kalawao.

The presence of such a man is pressingly needed to discern and properly treat the different conditions of the afflicted; to provide for social and moral order; to combine the functions of judge and executive; to regulate the construction and situation of habitations; to organize industries; to look to details of the living, and to administer for the dead; and in a word, there is needed a priest, a chief and a physician all in one man at Kalawao, and such a man should be sought for.

Your Committee will observe here, that this little kingdom has not been backward in meeting this great affliction. Certainly a small nation of 56,397 souls that provides in two years \$59,674.42 for only one portion

of its sick, is well vindicating its name and fame as a humane and civilized community; but as your Committee believe that still more can be done, as more of help is still needed, they recommend that provision be made, not only for the establishment of an eminent physician and man of ability to reside part of his time at Kalawao; but that provision also be made for a medical staff co-operating with and under him, to reside at Lahaina, Wailuku, Hilo, and other points in the islands.

It is manifest to your Committee that the terrible malady of leprosy presents a great variety of phases, some more or less subject to the influence of medical treatment; and it is simple humanity and justice to say that any individual suspected of, or presenting any indications of leprosy, should have the opportunity of careful medical treatment at his or her own home, and should not be condemned as an incurable and sent to Kalawao, except on the decision of a medical board or court of physicians. Your Committee must mention in this connection, that even the poor unfortunates of Kalawao have not been rendered so callous by the horrors of their situation, but that they remonstrated to your Committee against mingling in the same dwelling of apparently sound persons, freshly arrived at the settlement, with utterly diseased and loathsome cases. Father Damien commenting upon this point, stated to the Committee that the saddest feature of the settlement, was the intermingling of all conditions of the diseased, and the promiscuous intercourse of the sexes.

And here, your Committee are led to make a remark on the subject of contagion. According to all the indications of leprosy in Hawaii, contagion is apparently remote, and perhaps impossible in some cases. Father Damien is an illustration of this statement. He has been in the settlement a little over five years, and has mingled with and served the lepers under the most revolting circumstances, and yet he is as sound in health as when he first arrived; yet it may be, as is sadly supposed, that the seed of leprosy are implanted in his sys-

tem. Another instance of apparent non-contagiousness is the case of Luka Kaaukau, a healthy woman, who has been living with her leprous husband Hao for twelve years in the settlement. The man is one of the most frightful illustrations of the erosions of leprosy, as he has not a joint of a finger or toe left,—his limbs presenting only distorted, ulcerated stumps, and he is only a helpless trunk of a man. For over four years the devoted wife has put every particle of food into his mouth. He appeared a very intelligent man, and spoke very thoughtfully to your Committee about himself and his fellow sufferers. He said that many lepers in the settlement would have perished ere this, were it not for the faithful help between parent and child, husband and wife, brother and sister, and between friend and friend. He had wanted his wife to abandon his wretched carcass long ago, as she was sound and well, and might go back to her friends; but Luka said that she was content and happy to wait on the man she loved until his last moments, rather than go back to her friends; and your Committee take pleasure, whilst noting this instance of non-contagiousness, to place it on record also, as an illustration of fidelity and devotion in Hawaiian character.

The discussion of the contagion or non-contagion, and other features of the disease of leprosy are probably not within the province of the duties of your Committee; but they will refer to one subject in this connection, and often commented upon, and that is the health of animals, especially associated with the people. At the leper settlement, your Committee made frequent request to have any sick dogs brought before them, but notwithstanding much enquiry none were produced; and your Committee will say that of the large number of dogs, they saw running about the settlement, all seemed in a very plump condition, and very healthy, and all other animals, horses and cattle, running on the lands of Kalawao seemed in superior condition.

The question of contagion is rendered all the more

difficult of solution in view of the apparently healthy children, twenty-eight in all, born in the settlement. The Committee observed in a hut a leprous woman named Makahiki, who presented all the appearances of a badly diseased, incurable case, and yet had her fine, healthy child living with her, a bright looking little boy about two years of age. Her husband, Keoni Kahiapo, a healthy, intelligent looking man, with no appearance of any taint of leprosy about his person, said he had accompanied his wife on account of his great love for her; he had been with her in the settlement about five years, and would remain with her as long as she had breath. Your Committee are happy to notice this as another instance among Hawaiians of fidelity and devotedness, such as is an honor to the human race.

The situation and salubrity of this settlement are no doubt all that could be desired for well people, and can be made subservient to the comfort and welfare of invalids. But your Committee see clearly that many reforms are needed. Some of these reforms they have pointed out in connection with the dwellings, and food and clothing of the lepers, and medical provision for the sick in other respects. And in addition, they wish to speak of reform needed in the distribution of food. As stated to them, and as witnessed by their own observation, feeble lepers, with excoriated feet have to travel several miles to secure their ration, the bundle of taro, which is delivered from a boat on a shingly beach, often difficult of approach on account of the high surf which beats upon the northeast coast of Molokai. This difficulty in distribution might, to all appearances, be obviated at small expense by the employment of pack animals, and of a wagon or ox cart. And sick people should not be obliged to expose themselves, as was stated to your Committee, to the frequent rains of this settlement, whilst waiting for their ration of taro or of beef. And in no instance should the meat of animals which have died by accident be served out to invalids—as stated by Kekanchailua, and confirmed by Father

Damien. The latter says that quite recently, when 100 head of cattle were driven over the pass in the bluffs into the settlement, twenty head were killed by falling over precipices, and that the meat from the carcasses brought in from the ravines was served out to the lepers. As great complaint was made about want of light and cleanliness, your Committee would recommend that lamp oil, and soap, whitewash and disinfectants should be served out to these poor people gratuitously.

And your Committee are of opinion that all this can be accomplished without much increase of the appropriation. The nation has thus far combatted this great malady in a brave and generous spirit, and it must continue to do so, at the same time, that it looks to the Government to bring about all those reforms, which shall prevent the unnecessary dragging away of people from their homes, and shall furnish to the unfortunate lepers living at Kalawao all the necessaries and comforts for which their humane and generous countrymen have provided.

The government of this settlement is at present rather anomalous, and this is a matter, which in the opinion of your Committee should command the most earnest attention of the Assembly. As according to the present laws, the regulations of the Board of Health have the force of Statutes, it will be seen, that the administration of the affairs of the settlement, may combine judicial and executive powers, and the superintendent of the Board might according to law dispose of not only the liberty of a subject at his will, but possibly of life, if he deemed it necessary and had royal sanction. These great powers and prerogatives may not have been abused; but your Committee are of opinion, that the authority of the laws of the Kingdom should be directly represented in this settlement by regularly appointed officers; or it might be more expedient that the superintendent of the settlement, should be invested with the powers of a magistrate, and be assisted by a

proper executive. Hawaiian lepers, like all other Hawaiians are law abiding in their disposition ; and therefore they require, when subject to any discipline, regulation, or repression, that all should be done in accordance with the sanctions of the general laws of the land.

Our sad national calamity will command the attention of the civilized world. If dealt with in a careless, indifferent and niggardly spirit, and presenting in consequence only a spectacle of terrible human woe made more miserable by mismanagement, it will sink us in disgrace ; but if met and dealt with in a spirit of the highest humanity, and of the largest Christian charity and devotion, then will our great misfortune prove at last a blessing, and redound to the highest glory of our Hawaii nei.

WALTER M. GIBSON, *Chairman*,
 WILLIAM O. SMITH,
 JOSEPH NAWAHI,
 S. KAANAANA,
 WM. H. HALSTEAD,
 J. K. KAOLIKO,
 P. KANOA,
Special Sanitary Committee.

REPORT OF N. B. EMERSON, M. D., MEDICAL SUPER-
 INTENDENT OF THE LEPER SETTLEMENT, KALAWAO,
 MOLOKAI, AND SANITARY INSPECTOR OF THE
 BOARD OF HEALTH, MARCH, 1880. [JULY, 1879,
 TO JANUARY, 1880.]

At the beginning of this period, there were in the leper settlement at Kalawao, on Molokai, 458 male, and 344 female lepers above the age of one year, a total of 802. During this period, there arrived at the settle-

ment, 35 male and 12 female patients of the above mentioned age, and there were entered by myself, two males as lepers, at the settlement, the additions from all other sources thus amounting to 49. During the same period there died, of male, 61, and of female lepers, 33, amounting to 94, thus leaving on the 1st January, 1880, a balance of 717 lepers above the age of one year in the settlement. On the 1st July, 1879, there were also in the settlement three infants below the age of one year, the offspring of leper parents; and of the infants there died two, leaving three leper infants living in the settlement on the 1st January, 1880.

* * * * *

I cannot refrain from remarking with great regret the comparatively small number of lepers that have been brought to this settlement from without during the past year, when one considers the great number still at large in the community. I gravely apprehend that this may prove a matter of serious regret to the Hawaiian nation in the future.

The ratio of mortality among the lepers during the past half year has been equal to 57 85-100 per thousand per year. * * * *

It is a matter for congratulation that the children born in this settlement have been so few in number. The philanthropist and the merciful man cannot look on with complacency and see offspring born to a race, or a class of people, who, he is convinced, are with certainty doomed to a miserable and loathsome existence and premature death.

During the period since my first arrival at this place the effort has constantly been made to improve the physical condition of the people under my charge: by seeing to it that the rations of food and other necessities were served out regularly and were sufficient in quantity and of good quality; by bettering their habitations; by inducing in them greater habits of cleanliness; by ministering so far as possible to their comfort; by applying the arts of medicine to the relief of their

various intercurrent maladies, and finally, by diligent study of the prime cause of their woes, to alleviate and, if possible, promote a radical cure of leprosy itself.

As to food, each leper in the settlement and all children above the age of one year, the offspring of lepers, receive seven pounds of fresh or salted beef per week. Fresh beef is killed twice a week. When, as formerly, Columbia River salmon was served out in lieu of beef, three pounds were deemed a ration. With this they also receive weekly twenty-one pounds of paiai, or, as its substitute, seven pounds of hard bread, or nine pounds of rice with one pound of sugar. At times it has been necessary, instead of the poi, which cannot always be obtained, or instead of the bread, rice, &c., to issue raw kalo, in which case thirty-one pounds is issued per head; and again in some circumstances to serve out sweet potatoes, the most abundant crop of this region, a food often preferred by many.

Any of the lepers at their option are, under ordinary circumstances, permitted to commute their paiai for fifty cents in money. Many of them are so industrious and thrifty as to plant patches of food which suffice to supply the wants of themselves and their families, and thus are enabled to draw a certain amount of ration money from time to time, which serves them in good stead in adding to their comforts. Besides the articles of food mentioned, each leper is allowed five pounds of salt and a half a bar of soap per month, and each house occupied by lepers is allowed at least one quart of coal oil per month. Other articles that may be required by the lepers can be bought at the Molokai store at very moderate prices.

Thus it is fair to say that the people at the leper settlement have a more regular, abundant and a better supply of food than would be theirs were they at their own homes from which they have been separated.

* * * * *

Besides the numerous ailments which lepers are heir to, in the month of July, measles found its way to the

settlement. It by no means spared those who were acutely affected with leprosy, but dealing impartially all round it passed slowly through the settlement, lingering until January, by which time the epidemic seemed to have spent itself for lack of fresh material. A few deaths only are traceable immediately to this cause.

With the coming of damp and chilly weather in November, and even earlier, there were, as usual, active symptoms of leprosy, chills, fever, malaise, and general pains, often with fresh leprosy eruptions—to coin a word, a *leprosy fever*. I remark it as it is the first opportunity I have had of observing it in full force. A novice on meeting this *leprosy fever* for the first time might suppose he had to deal with ague.

As to success in finding means for the relief of leprosy and promoting its cure, all can be said in a few words, and those not of entirely happy augury. Much, I find can be done to assuage the miseries and pains of leprosy and bring the patient out of the slough of despond into which he is often liable to sink; but as to cure, no therapeutic agents that I have yet been able to lay my hands upon seem to offer any rational ground of confidence that the means have been found capable of eradicating the disease from the system, or even of suppressing its outward manifestations for any long period.

Sometime in April, 1879, the Rev. Mr. Damien, Catholic priest, received from China, a large quantity of medicine, known as Hoang-nan,* (pills) which was heralded as possessing the specific virtue of curing leprosy.

Much hope was set upon its supposed efficacy and it was immediately brought largely into use. Trial of this drug has greatly modified the esteem in which it was at first held, and shown that, while it is of service

* This medicine takes its name from its chief ingredient, the bark of the Hoang-nan tree, with which are combined realgar and alum. The pills are very rudely put up, and vary in weight from 1 grain to 22 grains.

as a tonic in some cases, giving the patient for a time freedom from wonted pains, and grateful sense of renewed vigor, in another, which are the majority of cases, it quickly produces depressing or even tonic effects. This drug is still on trial in the settlement. Judging from my experience with it thus far, it yields perhaps less satisfactory results in the long run than other well known remedies that are generally used in the disease.

* * * * *

[In a medical tour of Molokai] I met with quite a number of people suffering with syphilis in an early stage. In one house the father, mother, and their young child were so affected, while a leper girl was holding and tending the child, a very dangerous proximity.

* * * * *

My observation in traveling among the different islands of this group has more and more impressed me with the fact that leprosy is deeply rooted in a large fraction of this population, and that the lepers now outside of the leper settlement cannot number less than five or six hundred, and may even exceed that number. Omitting from the calculation, lepers isolated at the settlement, the number of those now at large in this Kingdom cannot be estimated at less than one per cent. of the entire population, which is probably a moderate estimate.

The more I study leprosy the more I am led to believe that it is a contagious disease, and that every leper is a possible source of infection to whomsoever comes in contact with him.

Making its appearance in these islands about 1856 or 1857, perhaps earlier, it has multiplied in geometrical progress, so that within thirty years, from being a strange and unrecognizable malady, it now reckons its victims by the thousand, and its features are become so well known, so stamped upon the public mind, that but few fail to recognize it at sight. Of all the causes, therefore, now operating to sap the vitality of the Hawaiian race, and to bring about its extermination, none

is so fraught with danger, and so calculated to alarm the mind of the well-wisher of this race as this disease of diseases. Science having as yet found no cure for it, philanthropy and patriotism unite in lifting up their voices to advocate the wisdom and necessity of the plan which has been adopted by the Board of Health, of separating the unclean from the clean, lest both perish together. I cannot, however, refrain from the remark that to be effectual, the method of isolation must be carried out vigorously: half way measures are of no use or of but little, and might always seem open to the charge of cruelty and injustice.

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HON. S. G. WILDER, PRESIDENT OF THE BOARD OF
HEALTH, 1880.

The position of a member of the Board of Health and especially the office of President is one of the most, if not the most, unpleasant that can be held in this Government. There is not a Hawaiian or foreigner in this country who has neither friends or relatives afflicted with leprosy, but will say, the law compelling the separation of lepers from society is a good and proper law, but so sure as it comes home to a household it is then considered unjust, the separating of families, the sending into exile any leper is no pleasant duty! * * * * * Hawaiians should not exhibit any unjust feeling against the officers who carry out the law. If all would conform and at one time give all that are lepers, the disease might be eradicated, but unfortunately Hawaiian will not shun the disease, will not cease to hold their relatives and friends until the poison has spread, until the afflicted becomes really offensive and a burden. However hard it bears, however much it costs there is no alternative but the strict carrying out of the law, separating the sick from the well.

HON. GODFREY RHODES, CHAIRMAN SANITARY COMMITTEE OF THE LEGISLATURE, 1880.

Up to the present day, science and benevolence, although indefatigable in search, have never succeeded in finding a remedy for the disease. The only preventive known by which escape can be made when the disease has once found footing in a community, is by segregating the stricken, separating the unclean from the clean; this has been practised in all ages and countries up to the present day. In some Christian lands so careful have been the authorities to prevent contamination that lepers have been confined and tended in a pest house, the sexes inexorably kept apart, so that there should be no propagation or transmission, until at last, in the course of nature, the country has been freed from the curse, and the dreadful habitations been tenantless.

In non-Christian countries the treatment experienced by lepers has been different. The unfortunates have been shunned, driven from house and home, and away from all communion with their kind, neglected, starved and even killed if they endeavored by stealth to find a home amongst their unstricken fellow men. How different has been the treatment experienced by Hawaiians, all who care may know. * * * Your Committee cannot come to any other conclusion than that known from all historic time, viz: that to prevent general contamination, enforced isolation of those smitten with this dreadful disease from the healthy is imperative, and must be vigorously enforced. * * * Your Committee would recommend that whenever the house of a confirmed leper is vacated by his removal to Kalawao, it and its contents, whenever practicable, should be burned, regardless of the apparent loss that may ensue, for it has been proved by our own experience, as well as by the accounts we find in Holy Writ above referred to, that contagion is spread by inanimate objects that have been used by the stricken. It

was reported to the last Legislature that three persons in succession infected from the disease were removed from one house, although they had not any communication with each other, but each of the last two occupants had removed to and taken possession of the dwelling on its vacation by his predecessor. This evidence your Committee regard as conclusive, and they consider the destruction of the tenement or house should be considered a beneficial measure, inasmuch as the future spread of the disease through that means would be rendered impossible, the suffering owner being supported at the expense of the State. * * * * * Your Committee believe that they are only doing their duty in not attempting to buoy up minds with rose-colored but visionary hopes, and in expressing their firm conviction that this pestilence, like any other calamity, must be unflinchingly encountered with promptness, energy, determination, and the most efficient means of repression we have at command. Should we indulge in the fond dream that the great trouble which overshadows the land can be dispelled by any but the most drastic and thorough treatment our awakening would be sad. We should gradually sink into loathsome decay and death, and our bright and beautiful islands would be shunned by the rest of the world as a living charnel house, instead of being sought as a place of refreshment and refuge; while if we manfully act our own parts, and resolutely help ourselves, we shall meet with sympathy on all sides, and be ready to adopt on the shortest notice whatever remedy for our evils science may discover or benevolence bestow.

REPORT OF DR. CHAS. NEILSON, KALAWAO, MOLOKAI, SEPT. 21, 1880.

To His Excellency Jno. E. Bush, President of the Board of Health, &c., &c.:

SIR:—I have the honor to transmit the following report of my medical inspection made at the leper settlement, Kalawao. * * *

The building consist of the "Hospital Dispensary," for hospital barracks, seven other small houses, and one small cook house. The dimensions of the above are, viz: Dispensary, 30x20 feet; barracks, each, 30x18 feet; the smaller houses, 10x12 feet. These excepting the dispensary and cook house include the entire hospital accommodations. These buildings are partially enclosed by a picket fence; the area of the enclosure embraces about three-fourths of an acre. The fence and buildings were well whitewashed, the latter inside and outside; they were cleansed bi-weekly by washing and scrubbing the floors.

The design of the buildings for hospital use was unsuitable, the ventilation imperfect. The patients in the hospital received their rations of food daily; those outside weekly.

The following patients and kokuas found the working detail for duty:

Ahia, leper, (native) acting hospital steward	\$ 7.00
Nakina, " " clerk of store and hospital	10.00
Kokuas* " sheriff	10.00
" leper, 1; policeman, 3 (each)	2.00
" harbor master, 1	4.00
" butchers, 4	5.00
" leper, 1; cartmen, 1	4.00
Policeman, 1; for hospital grounds, grave diggers, 1; dressers 1, in charge of native named Kalama, aggregate wages	17.00

The acting superintendent, Mr. Clayton Strawn,

* Kokuas.—Helpers, nurses.

having charge of the employees mentioned; his salary is \$25.00 per month.

The wages placed opposite the names written, represents their monthly pay. When help is needed to drive stock over the pali a detail is made from among the kokuas, who receive \$1.50 per capita for each animal's safe delivery at Kalawao. There was in the hospital forty-seven patients, male and female, in separate wards. I hereby annex the summary taken from the report specially made from date,

Males in Hospital	40
Females "	7
Males outside hospital	341
Females " "	235
	<hr/>
Grand total	623
Males admitted since July 20th	2
Females " " "	1
	<hr/>
Whole number to date	626
Deaths since July 20th, males, 10; females, 11.....	21
	<hr/>
Remaining	605
Birth since July 20th, two male children.	

I visited Kalaupapa on the afternoon of the 18th. This portion of the settlement is distant about one mile from the hospital towards the sea. I found many of the patients grouped together, they had been attending church and were returning to their places of abode. It was here I specially noticed the varied phases of leprous cachexia, chiefly of the tubercular type. I returned by the way of the sea shore visiting a hut here and there with a view to acquaint myself with their habits of life. I found many of them preferring to live near the sea in their grass huts; their diversion being that of bathing and fishing. I was informed by the apt superintendent, Mr. Clayton Strawn (himself a leper), who accompanied me upon my inspection, that they drank the brackish water found in the depressions made

in the rocks by washing of the sea, the rainfall and atmospheric action.

The water supply at Kalaupapa is derived from a spring at Waihanau, and in dry seasons the lepers are compelled to visit Kalawao to procure water, which they transport by means of coal oil tins and paint buckets. I returned to the quarters of the superintendent, from thence I revisited the hospital to examine into the clothing supply. I found (30) blankets which had been in former use by leprous patients non-diseased, also collections of their clothing. They had been washed and dried in the sun and were placed away for safe keeping. When the occasion demanded an extra supply of clothing it was furnished them upon application to the steward.

This constituted the entire stock of clothing on hand,—the patients lying upon their own mats. I found the hospital accommodations insufficient for the reception of the more aggravated cases. As they are naturally inclined to help each other, those who are scarcely able to help themselves should receive assistance in hospital and not be allowed to increase the general debility of others.

Their Hygienic Condition.—The hygienic condition of patients would be much improved if additional hospital accommodations could be procured. I would suggest that an additional hospital be constructed for the accommodation of at least one hundred patients, that it be constructed in a proper manner to insure more perfect ventilation; greater cleanliness, and add to the general comforts of the inmates; that its location is made upon the plateau of land facing the sea opposite the Wai-manu gulch; that suitable bath rooms be provided to secure a more thorough system of medication in connection with special treatment (namely, that by medicated inunction and bathing from time to time) which contributes so much towards their relief.

Their Dietary.—The paiai I found to be of good quality; beef cattle fair; the hard bread, much of it dam-

aged by weavils; the rice and sugar, good; the salmon, ordinary, and I wish to mention *pari passu* that this article should never be issued to leprous patients on physiological grounds.

The Water Supply.—The water supply comes from the Waimann gulch, distant about one mile from the hospital, conveyed by iron piping of an inch in diameter, beginning at the reservoir in the gulch, and ending at Kawaluna, which is nearly half way between the termini; from thence it is conveyed as far as the superintendent's quarters by means of an iron pipe three-fourths of an inch in diameter.

There are nine faucets between the reservoir and the superintendent's quarters to assist in supplying the patients, the horses and cattle in that portion of the settlement known as Kalawao. I found the water refreshing and pure. I suggest that another site should be selected at a point above the present location of the reservoir as there is a better spring at a greater elevation in the gulch, and a very short distance from the present supply. The reservoir should be constructed of stone and cement and enclosed at the top by a movable cover to assist in cleansing it when required, and that iron piping be laid along the entire distance having a diameter of not less than two inches, as the present supply is oftentimes interrupted owing to the smallness of the pipe at its terminus.

In relation to the usages which have thus far prevailed against sound medical reasoning I wish to invite your attention. I refer to the kokuas or helpers, male or female, as the case may be. They come and go at will, always, however, with a permit. His or her mission is apparently to aid the afflicted by ministrations to his family, relations, or friends. The husband domiciling with his leprous wife, or vice versa, awakens some apprehension in the mind of the medical officer who has the charge of their well being. To deprive him or her of their affectionate embrace at meeting or parting would be regarded as cruel and inhuman by some, yet

the medical man is asked to aid in arresting the progress of this terrible malady, and his counsel is supposed to have influence with the executive.

Without hesitation I am prompted to say that some action must be taken to prevent the healthy from comingling, feasting or dwelling together in the same apartments or else little can be expected since it is known that leprosy is a contagious disease; that medical scientists throughout the world accept without dissent this doctrine as conclusive, and many others are of the opinion concerning its infection. Without engaging in a discussion relative to this point, I am convinced in opinion from observations I have made personally in Brazil that under certain conditions I regard it as an infectious disease.

What can be done to check its progress? Establish a quarantine and seek to carry out good and effective sanitary laws. Upon arrival at the settlement of relations or friends of diseased persons the following obligations should be exacted from those who desire to see the sick.

1st. Ascertain if the proper permit has been regularly made out and bears an official signature.

2nd. The time granted (to him or her) to remain.

3rd. That the visitors be provided with apartments during their sojourn obviating their *constant* intercourse with patients.

4th. That their visits be confined to the day time; that their conduct be under the espionage of the policeman who is specially detailed to see that the regulations are enforced; that a daily report be required of him who is entrusted to perform this duty. Under no circumstances be they allowed to eat and dwell (during their visit) under the same roof. I know it will be difficult to secure a strict adherence to these regulations in the beginning, though it is necessary; a trial should be made to avert the present baneful system still operating.

If these regulations or others having in view the same objective cannot be enforced, in time the future of this

country will unfold a history ill-foreboding to the Hawaiian people, and that inestimable and priceless heritage, good health, will no longer be found among them. Thorough isolation is the initial point to be taken into consideration when dealing with this disease. It is the only means afforded to check its progress, the most powerful auxiliary to destroy it. In fact if proper hygienic laws cannot be made effective it will remain triumphant, germinating and spreading destruction through every conceivable channel of intercourse.

Articles of Export.—I will briefly remark that the hides, tallow and such other articles intended for export should undergo thorough disinfection before shipment. The produce raised by them should not be permitted in exchange or barter outside of the settlement; that the store be also disinfected, and that no leprous person should be allowed to handle the same from first hands. The free trade now existing between dealers in produce and supplies of various kinds should be interdicted and a rigid quarantine be established; that no interchange of commodities be sanctioned save through the Government agent who has charge of the purveying depot. They should be required to dispose of the number of horses in excess of the Government allowance as the herbage has grown so scanty that the milch cattle are suffering from a deficient supply of food. Of the various theories advanced by medical writers, that especially noticeable is the one of malarial origin; it has many supporters; that it occurs in both tropical and frigid countries is equally true; that *per se* it may be of idiopathic birth due to perverted nutrition which may be partially causative. The literature of medicine has contributed but little knowledge towards this subject matter, and less concerning its therapy. We are forced to speak of it as we do of other diseases that it may be acquired by contact, namely: intermarriage, cohabitation, inoculation, vaccination, and by hereditary transmission. The latter is proven beyond dispute. One of the most potent and constant causes

operating among these people is that one of promiscuous cohabitation. I believe it safe to say that the syphilitic virus operative in a leprous patient is the medium through which the constitutional infection of both diseases is conveyed, that once implanted upon sound tissue an ulceration ensues which evidences, sooner or later, a progressive enthetic poisoning revealed by the integumentary system when both pigmentary and glandular phenomena are apparent, peculiar to each disease.

* * * * *

I wish to remark here that there were no disinfectants remaining on hand among the medical supplies and that the hospital nor buildings pertaining thereto, nor the houses on any portion of the settlement have been disinfected for the past two years.

* * * * *

I will add that the medical supplies now on hand are insufficient to meet the present demand; they are in need of many articles (pharmaceutical) that have been expended, and many remedies are wanting that they constantly require. A requisition should be made out immediately for their benefit in order that they be not deprived of regular and continuous treatment.

The absence of a medical officer for so long a time has caused to many of them great dissatisfaction and distrust.

CHAS. NEILSON, M. D.,

Medical Officer in charge and General Superintendent at Kalawao, Molokai.

REPORT OF CHAS. NEILSON, M. D., RESIDENT PHYSICIAN,
LEPER HOSPITAL, MOLOKAI, JULY, 1881,
H. A. P. CARTER, PRESIDENT.

* * * In reviewing my work at this settlement during the semi-annual period ending July 1st, 1881, I am pleased to notice one improvement in a hygienic sense, namely, that the houses have been whitewashed, which is in striking contrast to the dirty, miserable looking tenements that greeted my eye upon my first coming. * * * An improved hygiene is what is first and most needed to successfully combat all diseases.

1st. A removal of all appreciable sources which are known to be productive of disease germs.

2nd. To construct houses for hospital and other uses which will ensure the most perfect ventilation without undue exposure to the inmates, and to insist upon them being kept clean.

3rd. A plentiful supply of pure water, and lastly to issue a generous dietary of fresh meats and vegetables; together with suitable articles of clothing adapted to the climatic changes incident to the locality. I will now ask have these conditions been fulfilled? I will reply in the negative to some of them. In answer to the first of the necessary conditions, I will add that I have failed to interdict the use of salt food, (I refer to their eating meat which they salt for their use) as well as that of fresh pork.* * * * The traditional luau of the natives with fresh pork as chief staple article of diet prevails despite my admonitions to the contrary; all entreaties of mine to abstain from eating these diseased animals have failed.

Unless this pabulum for the disease be removed all efforts to secure a more perfect system of hygiene for

* Dr. Neilson maintained that the hogs, dogs and chickens at the settlement were diseased with leprosy, and demanded their destruction by the Board of Health.

these people will fail, and the therapy of medicine be futile to record satisfactory results. Concerning the hospital buildings, I will refer to my quarterly report wherein I said they were all well adapted for the purposes required of them. The houses occupied by the lepers will answer very well, provided they can be kept clean. In many instances the occupants are too debilitated by the disease to do more than provide themselves with food, and seek their mats for relief, whilst hospital accommodations are insufficient to give shelter to many who are in need of greater assistance. The water supply is abundant during the winter season for all uses, in summer it is limited, and great inconvenience is experienced by those in constant need of bathing. The supplies of beef, mutton and paiai are regularly issued, together with other rations of food; they are of excellent quality, the same being true in reference to the clothing supplies. As leprosy in these islands is a disease of propagation and not one of production, I am prompted to refer again to my last quarterly report wherein my views relating to the establishment of a rigid quarantine for these people have been expressed. It being a contagious disease, may I ask why are people allowed permits to visit this settlement, to eat, and dwell among the lepers during their sojourn, returning to their respective homes to mingle among the healthy. I will say I am powerless to prevent it.

* * * * *

In proof of the activity of the contagion of leprosy witness the rapid propagation of this disease since 1851, the rapid decrease of population irrespective of its existence, and note the great number of lepers still at large. Have they decreased in number? No. Has the partial isolation adopted by the Government been successful in retarding the progress of this malady? I say not. Whilst still the baneful causes of contagion are still operative there can be no remedial measures instituted that will achieve even a temporary victory over the steady leprous march to the grave,

The law of hygiene must be respected in dealing with this dreadful malady if this Government has in view the perpetuity of the Hawaiian race. The pernicious practice of permits being granted to a people entirely ignorant of the dangers attendant upon visiting this settlement is known to every medical mind in this Kingdom. The reply of Mr. Clayton Strawn (himself a leper), is that the Board of Health has not provided a house for the reception of visitors, and he cannot prevent the relatives of the patients upon arrival from kissing, eating, smoking, hand shaking, and dwelling together during their stay.

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There is no better field in which to study the pathology of leprosy than in these islands. Let us first, however, improve the hygiene of these people before we attempt medication, or otherwise we will fail of success. The defective hygienic conditions now present will ever defeat the aim of the practical clinician as well as the scientist who seeks knowledge of this disease in this country. Let a dead house be secured, say at the small pox barracks, (as your Excellency suggested to me) as a suitable location, for the purpose of investigating the pathology of leprosy diseases. Let there be appropriate apparatus provided to aid in obtaining knowledge of this disease together with a few metallic boxes in which to convey the cadavers from the settlement. Then those having charge of this investigation will have an opportunity of verifying at least in these islands the peripheral or centric origin of the disease. Let the Government make a liberal appropriation for this purpose and appoint those to perform this work who are devoted to the interests of medical science and whose object is not entirely mercenary.

The fact that leprosy attacks more readily those whose vitality has been impaired through chronic malarial diseases (in the East Indies for instance), where the malady is endemic, is of no scientific value in a medical sense, diseased action is invited whenever the

vital powers of the system are reduced below the healthy standard of the individual whether he lives in India or elsewhere; equally absurd is it to ascribe the *de novo* cause of leprosy to the climatology of the country or to the peculiar dietary of the people since it is known to occur both in the North Temperate Zone and the tropics; still happening among a people whose mode of living is dissimilar in every respect excepting their bad hygienic condition.

I regard leprosy as essentially a neurosis; the principal factors productive of the disease are poverty, ignorance, scanty and unwholesome diet, continuous living in a vitiated damp atmosphere, with insufficient raiment and impure water. These conditions invite the peculiar bacteria which are unquestionably in the blood of the leper wholly unlike those found in healthy blood. Whenever the disease exists among a people with these conditions present it is certain to fructify and destroy life. Elephantiasis, a disease, simulating leprosy, does not make any progress in the United States of America because the conditions of the people are different from those of the lower order of natives in the Argentine Republic, Brazil and other South American republics. It is purely a tropical disease.

* * * * *

Leprosy is a disease which will make no progress in the United States of America, unless through hereditary transmission and propagation; its life would terminate with the individual who was the unfortunate possessor, owing to the existence of stringent sanitary laws. In no country has it been found to germinate with greater rapidity since its advent than here, owing to an excess of those fertilizing materials ever constant among these people, consequent upon their superstitious adherence to their primitive customs, until it no longer can be said that this malady is not endemic to the Hawaiian Islands.

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It may be asked do persons afflicted with leprosy ever recover? Yes.



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Notwithstanding the climatology and dietary of the people an improved hygiene coupled with an appropriate medication has proved successful in some cases. From the Norwegian hospital at Norgegaard we have like testimony emanating from Dr. Danielsen, a gentleman whose scholarly and medical attainments are known to science. He mentions recoveries constantly occurring under the prolonged use of salicilate of soda in granule doses with sufficient alcohol as the solvent, given three times daily.

There is no specific remedy for leprosy, nor is there for any other disease to my knowledge. Do not think that the recoveries from this terrible disease is due wholly to medication; it is not. Establish the most perfect hygiene possible, then direct the medical treatment when the disease is the result of propagation, and not of hereditary origin; in its early stages it is amenable to treatment. It is in these cases where we note the recoveries.

Retrenchment in expenditures is a fatal policy when dealing with a national scourge like leprosy. I will now invite your Excellency's attention briefly to the treatment pursued at this settlement. In December last, I received, at my request, a quantity of gargon oil from the customs of the Government, which had been sent for use at this settlement, after having read carefully the reports concerning its great value in the treatment of this disease. I began to use the oil at the settlement the latter of December; after using it for a couple of months, I was satisfied it possessed curative virtues. I wrote favorably of it then, having had no occasion to change my opinion since. I recommend that the Government be asked to provide more for use at this hospital.

Of the twenty-five cases in hospital who began the use of this oil as divided by myself, many of whom were in an advanced stage of the disease, three only have died; the remainder still continue its use express-

ing themselves as feeling well when asked the state of their health. During the winter months the patients were compelled to suspend the treatment by inunction, owing to the absence of bath rooms wherein they could bathe and be protected from the chilly winds prevailing at that season. I will here remark that bath rooms in proximity to the hospital buildings are sadly needed to aid in promoting cleanliness of person among the patients. I am now unable to induce the natives to continue the use of the oil by inunction owing to the absence of bathing facilities.

I found that as long as the oil was used as first directed, an amelioration of all the symptoms followed, with decided changes in the skin eruptions. The average length of time required to remove the psoriasis of the skin (a most distressing skin eruption accompanying this disease), was (13) thirteen days. In adding my testimony to its value as an adjunct to the treatment of this disease, I will say that in every instance both in hospital and outside (where it has been used extensively), I know of no case in which it has failed to improve the general health of the patient. The patients who had been taking the Hoang-nan pills, the Japanese medicines of Dr. Goto, relinquished their use for the gargon oil treatment with which they are better satisfied. I have alternated this treatment with that of quinine in large doses. Better results have been obtained from the use of the hydro-bromate than the sulphate which I employed. My plan was to give sedative doses at bedtime to the extent of twenty grains, guarding against cerebral disturbance in the extreme, and iron through the day. I am perfectly satisfied to know that quinia in large doses arrests the deposition of granulation tissue formation. Of the many topical agents whose virtues have been praised for their discutient effect they exercised over the tubercular deposit, none have produced such marked success as arsenious acid in the form of an ointment applied until pustulation results, then dressed with chlorinated soda lotions. In the

ulcerative stages when the destruction of tissue has
 been extensive bromide has proved of great service.

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REPORT OF THE PRESIDENT OF THE BOARD OF
 HEALTH TO THE LEGISLATIVE ASSEMBLY, 1882,
 W. N. ARMSTRONG, PRESIDENT.

In October last, my predecessor, Mr. Carter, succeeded with the kind co-operation of Her Royal Highness Liliuokalani, in procuring a lease of the premises at Kakaako, near Honolulu, upon which he caused to be erected buildings which should serve as branch hospitals. It was intended that those who were said to be lepers, should be placed in this building until it was clearly decided whether they were or were not lepers, and if it was finally decided that they were, that they should then be removed to Kalawao, in accordance with the well established rules. There had been complaint about rough treatment of lepers, and that persons suspected to have the disease had been cruelly seized and removed to Kalawao. By using this branch hospital it was hoped that such complaint would be avoided.

Dr. G. L. Fitch took charge of this branch hospital. On account of his success at the dispensary, large numbers of lepers at once came to the hospital. It contains at present 92 patients. Not only the lepers of Honolulu, but those of other islands applied for admission. The buildings were increased as fast as possible. When the lepers found that they were not to be hurried away to Kalawao, and also believed that they would be cured by Dr. Fitch, they did not hesitate to come forward. The result is that the lepers are coming forward freely. A controversy has arisen between Dr. Fitch and other physicians of the Kingdom as to the nature

of leprosy. Dr. Fitch insists that leprosy is merely syphilis in its "fourth" stage; that by the constant use of medicine it may be considerably, but not permanently relieved: and that it is not quickly contagious, especially among the Hawaiians, whom Dr. Fitch claims are "saturated" with syphilis. Other physicians admit that the disease may be relieved for a short time; that the disease is not very contagious, but they deny that it is syphilitic in any form. The medicines used by Dr. Fitch have been known and used here for some years. These are iodide of potassium and salicylate of soda.

Owing to the want of systematic investigation in the past and the failure to keep complete records of the disease, very little is known about it. The well-known opposition of the natives to post-mortem examinations prevent valuable researches. On the point of contagiousness of the disease there is much to be learned. The practical subject for the authorities is how far isolation must be insisted on. The physicians of other nations insist on isolating lepers. So do the physicians here. Dr. Fitch claims that when the leper is relieved by proper medicine, he cannot communicate the disease, and it is safe for him to be at large. He admits that the disease will increase again. The question then arises, is it safe to allow one to go at large who has leprosy, even though it be only a slight taint? He may be able to communicate the disease. If he is, it may be fatal to the Hawaiian race for him to be at large. This is no time to try experiments with the life of the natives. Perhaps Dr. Fitch is right. He has been in the country less than two years and has had experience with leprosy during that time. Drs. Hoffman, Trouseau, and many other able physicians, who have served the people well do not agree with him. There are probably 2,000 lepers in the Kingdom, or five per cent. of the whole native race. It is probable that as many more have seeds of the disease. So many afflicted with the disease is very extraordinary. It may be safe to

permit the lepers to go at large after they have been treated, but if a mistake is made fatal results may follow.

The proper course to take in this matter is not clear. Instead of using the branch hospital as originally intended it is now being made a permanent leper settlement. Those who are incurable are retained there. None are sent to Kalawao, except for disobedience of orders. This course is permitted rather as an experiment by Dr. Fitch. It will result in this however, if it is further pursued, that a great leper settlement will be built up near Honolulu. In the hospital and in the city there are now about 400 lepers, and the number is increasing constantly.

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The Leper Settlement.—The accounts of the settlement show an expenditure of \$85,255.89 out of an appropriation of \$85,000. The people are well supplied with food. No complaint of any kind has been received by the Board of Health from the lepers for a number of months although there is no physician there. While physicians resided at Kalawao, complaints regarding them were frequent. Mr. Meyer, the superintendent informs me, that the people prefer to be without a regular physician. It is difficult to secure the services of a good one who will reside at the settlement. Many of the lepers prefer treatment by kahunas, and do not wish to be put under rule by any foreign doctor. If any are made, it is the experience of the Board that complaints are at once made, if the lepers are restrained. Still, if they cannot be benefitted by doctors or rules, what should be done. If they cannot be benefitted, it would be unwise to put them under any restraint. Their condition is unfortunate, and it should not be made worse by depriving them of their liberty by keeping them in hospitals, or regulating their diet. There is some hospital accommodation, but the people do not use it. Nurses are needed, for there are many who cannot help themselves. Such nurses should be se-

lected from among the lepers who are able to work, and they should be trained to take care of the sick, and especially those who are old and feeble. It is hardly right to take the lepers away from the care of their friends and leave them alone to care for themselves. This subject will receive more attention in the future.

* * * * *

There should be accommodations for those who have good reason to visit their friends at the settlement. Even if isolation is necessary there is no reason why, under certain restrictions, the people should not see their friends, as they now do at the branch hospital in Honolulu. When a leper is seized and taken to Molo-kai, it is a sentence of death. He has committed no crime. He has met with a great misfortune. He is driven out of society, that others may live. Without intending to act harshly, the Government has not been careful enough of his feelings. For this reason he has often refused to give himself up, and the disease has spread: Kalawao is a pleasant place. After the leper has lived there a few months, he is contented to a certain extent. The policy of the government should be to treat him so that he may enjoy life while he has it. By erecting a building near the landing and surrounding it with a picket fence, visitors could be permitted to see their relatives without touching them. In certain cases, they might in company with the police, visit the homes of their friends, if they cannot move. Instructions have been given to the superintendent to erect such a building.

The purpose of the law in isolating them is greatly obstructed by the existence of *kuleanas* in Kalawao. These belong to private persons, and the Government has no right over them. The consequence is that the friends of the lepers gather in these places, and the lepers go there at night. It is impossible to stop this, unless the Government purchase the *kuleanas*. There are probably 100 acres of these lands.

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REPORT OF DR. G. L. FITCH, MEDICAL SUPERINTENDENT OF THE BRANCH HOSPITAL AT KAKAAKO, AND RESIDENT PHYSICIAN OF HONOLULU, MARCH, 1882.

* * * From such inquiries as I have made among lepers and intelligent natives from different parts of the group, I believe the 508 cases who have applied for treatment during this quarter, and those of last quarter, comprise a majority of those at large now in the Kingdom. Including the number at Kalawao (about 700), and the 92 now in the leper hospital here, I think I am safe in putting the entire number at, not to exceed, 1600 cases in the Kingdom. Many of these are extremely light, a sort of anæsthesia, or a few tubercles, the general health in no way being greatly disturbed.

The disease, however, is everywhere among us, members of the police force, the soldiers, the band boys, pastors of churches, teachers, students, are all among the sufferers. (Of course it will be understood I refer only to natives).

That 508 cases should apply for treatment in a single quarter shows that the endeavor to enforce the law of segregation as it has been carried on here for years, has been a most complete failure, and considering the kindly, loving nature of the native race, and the heartless manner in which sufferers have been treated, the only wonder is that as many cases have been sent to Kalawao as are there now.

As my opinions in regard to leprosy have been made a matter of public comment, I desire here to make known my views as far as they may concern the public at large. Leprosy is the fourth stage of syphilis, a stage that white men are exempt from in a vast majority of cases.

First.—By reason of hereditary immunity.

Second.—By reason that medical science has advanced to such a stage that while we cannot kill the disease syphilis, we can most heartily scotch it.

Now let us look at some of the facts as they are presented to us in these islands :

First.—During the forty years or thereabouts, that leprosy has existed here, less than twenty cases all told have ever appeared among the whites. Two or three children, one young woman, a dozen or fifteen men ; and yet how much doubt is there that a large number of white men have contracted syphilis from these native women. These cases of syphilis have not run into the fourth stage, or leprosy, simply by reason of hereditary immunity and the services of physicians, most strongly the first reason. The children who have had it are commonly believed to have contracted it along with vaccine virus used in vaccinating. Men who have had it have contracted it the natural way and have simply received a just recompense and reward for their licentiousness. In these few cases, those unprotected by hereditary immunity, the disease has run on into the stage known as leprosy.

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Now if upon the disease as existing in the tertiary stage we find so clear opinions that a radical cure is impossible, what can we expect in the fourth stage or leprosy ?

And yet while authorities all agree that the disease is incurable, all equally agree that its horrors may be greatly mitigated in a large proportion of cases.

* * * * *

But let us turn from disputed points to one where I think I am justified in saying medical men here all agree, namely : A person with syphilis presents a more favorable field for leprosy to work upon.

Now if this be true and the statement made at a recent meeting of physicians by one of the oldest and most favorably known of the medical fraternity of Honolulu also be true, namely, that four-fifths of the native population of these islands are infected with syphilis.—I believe this statement too mild.—What is the duty of the Government in the premises? Let us couple the

two facts. For all practical purposes, every native in the group has syphilis and all are ignorant of the laws of health and hygiene and ignorant of the value of medicine to effect relief.

* * * * *

Now let us consider the possibilities with regard to cure in leprosy.

First.—Let us define what is meant by cure. If cure means that tubercles can be dispersed and anæsthesia disappear leaving no trace of either; that crooked and distorted fingers can be made straight, that racking pain leaves the body and the patients are made to look the picture of vigorous health, no vestige of the disease remaining, or at least so little that no physician examining would for a moment think of pronouncing the person a leper, then I am ready to declare that leprosy can be cured and to declare further that I have cured a considerable number of cases. Time and time again, I have seen fingers which were contracted firmly into the palm of the hand, straighten out, anæsthetic and discolored patches of large extent disappear, and tubercles also, leaving the skin soft and supple and of natural sensibility. But I do not understand the word cure. If after the lapse of years these cases so *improved*, continue in health and strength with no signs of returning disease and finally die of old age without manifesting any signs of the disease; then and not until then shall I believe this thing can be cured.

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Danielsen, in a communication to this Government some months ago, avers that he cured one-third of the cases coming to him in the earlier stages of the disease.

I am using the means he recommends and the results are wonderful.

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It follows as a necessary sequel, if my views in regard to leprosy are correct, that leprosy is not infectious or contagious, as it is a well-known fact syphilis is not in any manner communicable *as syphilis*, after the

secondary period. This matter should be fully investigated. Condemned criminals should be given the choice of inoculation with the blood and matter from leprous patients or execution as preferred by them. That such a chance as has been presented for many years for scientific investigation in regard to this matter has been entirely unimproved by medical men who have had charge and direction of the medical affairs in this community; that science has been made no whit the richer as a result of their labors; is one of those things that may be explained in eternity, but cannot be in time, unless it be that their minds were too dull to grasp the wonders going on around them. That this race is now going through a change, such as Europe went through some centuries ago, by which that part of the world is now protected by hereditary immunity from the worst results of syphilis, I have no doubt. That they can be so generally sufferers from this disorder and still retain superb physiques which so large a proportion of them still have, proves conclusively that there still remains an immense amount of latent vigor in the race. This brings us to the consideration of the reason why this disorder has been allowed to run on unchecked and uncontrolled.

Reason number one is undoubtedly their uncontrolled licentiousness. They have to learn the lesson that this thing is *certain, sure and inevitable death* to themselves and offspring and race, and the sooner they right-about-face the better their chance.

Reason number two, and a strong reason, is the dislike of the native to apply to Government physicians for advice and treatment. His great fear that he would be pronounced a leper and hurried off to Kalawao has been partly the cause, and unfortunately in many instances the physicians employed by the Board have been gentlemen too much engrossed in raising sugar or gentlemen of elegant leisure to such an extent that if a native applied for treatment without a liberal fee in his hand, his wants were very poorly attended to. Now to

a people just emerging from barbarism hardly conscious of their own necessities, with faint ideas of the value of medical treatment, such work as this is simply nothing but a ghastly mockery. Your Honorable Board should in my opinion forbid a Government doctor to charge a native for medical service, and every doctor should be required to visit all portions of his district every week and attend faithfully to every case presenting itself for treatment. To simply put a doctor in a field and pay him a salary and receive nothing in return, may suit a man who wants his time to himself and a salary thrown in, but it is extremely unjust to both people and Government.

By no people in the world is a kindly care for their welfare and courteous treatment more appreciated than these, and they will not go to a physician whom they don't like and respect, any more than a white man will. To act when a native goes for treatment as if the matter were hardly worthy of serious consideration, or to roughly inform him that there is nothing the matter with him while the poor wretch is suffering with syphilitic rheumatism, then give him a dose of salts or castor oil and send him away is not calculated to increase his respect for medical science or his love for the doctor. On the contrary I know from personal experience that a careful attention to their pressing wants and necessities—no people ever needed care and attention more than these—will insure prompt and careful obedience to the instruction of their medical adviser and a firm and abiding faith and earnest desire to show their regard and gratitude to the physician who faithfully does his duty by them. But licentiousness alone is not to blame for the spread of this disorder. Passing the tobacco pipe from mouth to mouth is not an uncommon cause, and I fully believe the custom of numbers eating poi out of the same dish, with their fingers, also comes in under the same head.

Europe once saturated with this disorder has emerged to a great extent, and I believe these people are begin-

ning to awaken from their long lethargy and now with a strong helping hand they may hope to escape and once more become what the race was in the past, a strong, hearty, vigorous people.

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REPORT OF DR. N. B. EMERSON ON A VISIT MADE TO
THE LEPER SETTLEMENT, MARCH, 1882.

* * * The condition of the dwelling houses has been greatly improved during the last two years, and it is safe to say that nowhere, outside of the settlement, is there an equal population of Hawaiians so well housed and sheltered. The condition of the house in the hospital grounds is also most excellent.

* * * * *

The *kokuas* are an indispensable arm of service at the settlement. Without them it would be a very difficult task to carry on the establishment. They climb the pali and drive down the cattle, they fetch the wood from the mountains and carry water from the valleys, they go into the water and cultivate and pull the *kalo*, they handle the freight landed at Kalaupapa, all of which are services the lepers cannot perform for themselves. They do the work which only sound hands and fingers can do. In fact this important and necessary class of people supply hands and feet for the leper when his own give out. Yet a danger arises from a possibility of these men carrying away with them the germs of leprosy and distributing them when they leave on their occasional visits to their houses on the other islands. When it is borne in mind that these people have leprosy relations, wives, husbands, children, brothers or sisters with whom they live, while in the settlement, on terms of unrestricted and fearless intimacy, this fear will not be thought groundless.

* * * * *

I could not but be painfully impressed with the ravages made by the disease among the people of the district since my departure from the settlement in 1880. This was evidenced by the number of deaths that had occurred, by the changed aspect of the great number who showed increased evidence of the hold the malady had upon them. Features had become more bronzed, thickened, distorted and unrecognizable, extremities had become mutilated or lost, eyesight in some was extinguished, and those who then possessed considerable vigor were now unequal to their former activity. To come now to the great and important question of the sanitary and medical wants of the lepers at Kalawao; these may be summed up in one sentence, the need of a physician to reside among them, and I should also add a certain number of nurses. On asking them what were their troubles, their *pilikias*, they almost with one voice said that their one *pilikia* was the disease they bore in their bodies and their one need was that of a physician.

Said one of the most intelligent and thoughtful among them, himself a great sufferer, "It is not that we have any hope or expectation that any physician can cure us of leprosy, but that we need and wish some doctor to abide with us and care for us, to treat our sores and ulcers, to minister to us in the numerous other maladies which constantly prey upon us." Similar expressions were made by so many, and repeated in such a variety of forms, that I could not but be convinced this was their sincere wish and represented the sentiment of the majority. * * * Before leaving this point, let me say the Government has done much for them in giving them this spacious and fertile land for their home, and in satisfying so many of their wants, but its whole duty to this unfortunate class will not have been done until it shall have provided for this great want of the leper settlement at Kalawao. Leprosy is the chief, but not the only disease from which they suffer. They are specially subject to affections of the

bowels and lungs, to fevers, dropsies and numerous other intercurrent maladies; their skin is liable to various painful and annoying eruptions, and their whole body to ulcers and putrefying sores. All these require the constant attention of a physician.

* * * * *

I cannot but regard this as a fitting time to consider briefly some theories and views that have been publicly expressed in regard to the nature and sanitary management of leprosy. The importance of these views lies solely in the influence they may have in leading to a sanitary policy that is full of peril, and likely to prove destructive to the Hawaiian people.

The assertion has been made that leprosy is but the fourth stage of syphilis. This cannot be substantiated by any medical authority whatever.

Historical leprosy antedates syphilis by many hundred years, and its worst ravages in Europe were committed while syphilis was yet unknown. How can leprosy be derived from syphilis, be its "fourth stage?" If the "fourth stage" theory be true, why do not numerous cases of leprosy appear simultaneously wherever syphilis has prevailed? Neglected syphilis, syphilis not thoroughly treated, or not treated at all, is common enough the world over; but we do not find such cases running on into leprosy. The Kamschatkans are very abundantly diseased with syphilis and have been for a long time, but leprosy does not prevail among them. As a fact, we find syphilis producing only its like, syphilis, and leprosy only its like, leprosy. Inoculate syphilis in any inoculable stage, and we get but the one and the same disease syphilis, which to scientific men the world over has thus far presented but three not four stages.

Again leprosy appears in groups, affecting families and people living together; it does not spring up sporadically here and there. If any one has leprosy it will be found he has been exposed to the contagion of leprosy in one way or in another. I have carefully ex-

amined hundreds of cases of leprosy, talked with them in their own language and learned their histories, and have, with only a few exceptions, traced the origin of their disease to previous leprosy intimacies or relations.

It is true the Hawaiians were extensively diseased with syphilis before the appearance of leprosy among them, but they *were not all diseased, and are not to-day*; there is a very considerable majority who are exempt. I look upon it as an unjust aspersion of this race to make such a sweeping assertion regarding them as has been made on this point.

In order to satisfy the condition of the "fourth stage" theory argument, it must be clearly proven that every leper was first syphilitic, and that none but those having had syphilis in an advanced, or third stage, have shown leprosy, the so-called "fourth stage."

But as a fact, there are plenty of cases of uncomplicated leprosy among the Hawaiians who had been and are free from syphilis. It will not do to assume that every ache and rheumatoid pain, every indurated lymphatic gland, every necrosed bone, every cracked and fissured tongue comes of syphilis. Such loose diagnosis as this deserves no refutation. Again, anyone well acquainted with the Hawaiian language knows, that while the Hawaiians have several words they apply to the lesions of venereal diseases, they have no definite and scientific knowledge of, and have no means of accurately expressing the difference between a simple non-constitutional venereal sore and a genuine Hunterian chancre, the first lesion of syphilis. As a consequence, a Hawaiian will be likely to say he has had syphilis (kaokao, or pala) when he has merely had a non-syphilitic venereal ulcer. A good knowledge of Hawaiian therefore, is essential to elicit the facts in such a matter from a Hawaiian patient.

On the theory of "hereditary immunity" of Erasmus Wilson, which has curiously enough, been adduced, the Hawaiians who have had a century of syphilis, ought by this time to have purchased some amelioration in the

disease, and it is not logical to suppose that leprosy, a vastly more severe and stubborn disease than any stage of syphilis, is related to this by any such principle as this. The argument works the wrong way.

The clinical history of leprosy and syphilis differ widely. It is impossible to go deeply into the differential diagnosis of these two diseases. But briefly :

1.—The period which the disease lies latent in the system in syphilis is reckoned only by months, whereas, in leprosy it is prolonged to years.

2.—The skin symptoms of leprosy and of syphilis are markedly different. In patients, who like many of our Hawaiian lepers have both syphilis and leprosy at the same time, there must and do occur puzzling cases, but study will disenravel the tangle.

3.—The nervous symptoms, the insensitiveness to touch (anæsthesia), and to pain (analgæsia), and the various palsies, all of which are very common to leprosy and are a marked feature in this disease, are rare in syphilis, and when they do occur in syphilis, are of quite a different type and anatomical distribution. It is true that (anæsthesia and analgæsia) insensitiveness to touch and pain, occur in syphilis as pointed out by Fournier, as well as in leprosy. But insensitiveness to touch and pain are *not diagnostic to leprosy* by any means, nor does Erasmus Wilson anywhere say that they are. Any physician well acquainted with the various manifestations of nervous diseases would not be guilty of such a blunder. These changes of sensibility are diagnostic of no one disease, but are common to several. Leprosy is to be diagnosticated by no one such rational symptom, but by a group of symptoms taken together. But what does Fournier say ? His words are, (*Leçons sur le syphilis*, p. 800.) Do we not see elsewhere similar phenomena produced in a good number of poisonings ; poisoning by lead, arsenic, alcohol, etc. ? Pathological analogy testifies strongly in favor of the opinion we here maintain, and permits us to believe that the poison of syphilis can, like other poisons, react on sensibility.

* * * * They are not then peculiar to leprosy and syphilis.

But to illustrate the difference in the palsy produced by syphilis and that by leprosy. A certain nerve branch which supplies the circular muscle that closes the eye, is a favorite seat of palsy in leprosy, producing the familiar deformity (known by the Hawaiians as *maka-helei*) which makes it impossible to close the eye. This nerve branch is very rarely affected in syphilis. Leprosy in a large proportion of cases affects the ulnar and other nerves of the arm and hand; affections of these nerves by syphilis are pathological curiosities.

The ulcerations of leprosy and of syphilis are quite distinct and need cause confusion only when occurring in a mixed case. In leprosy the bones of the extremities are the ones almost exclusively affected. In syphilis the bones of the head and shafts of the limbs are the ones principally seized upon. In syphilis nodes are often formed, not so in leprosy.

5.—Hereditary syphilis produces a peculiar and well-known deformity of the teeth; the teeth of lepers are not affected.

6.—Again syphilis is a curable and leprosy, thus far, eminently an incurable disease. For testimony on this point read such authors as Fournier, Bumstead and Taylor, etc. To quote from Bumstead and Taylor, “we know that the great majority of cases (of syphilis) (estimated as high as ninety-five per cent.), which have been thoroughly treated are absolutely cured, and are never followed by a relapse. * * *

Save in the earliest stages, before the development of objective symptoms, the diagnosis of leprosy presents few difficulties. The Hawaiians make the diagnosis with great correctness and rarely fail.

In estimating cures, or attempts at cure at their right value, the well-known fact must always be borne in mind that recessions are the rule in leprosy, especially in the early stage of the disease. It must not be inferred that because improvement follows the use of cer-

tain medicines, even though this be found true in many cases, that such improvement is caused by the medicines used and is a cure. The improvement occurs also without the medicines. *Post hoc* is not always *propter hoc*.

Too much emphasis cannot be put on the fact that leprosy is a contagious disease or at least capable of communication from the leper to a well person. The germs lie latent for many years; but at length they produce a crop, and they finally kill. The whole history of leprosy from the earliest times to now marks it as a disease that has propagated itself by human intercourse, and has extended its ravages as its human vehicle, man, has carried it from one land to another, and that it has been scotched or killed only as the result of the most active measures of repression and isolation.

"Leprosy is contagious." * * * * "Its contagiousness demands its isolation," says Pere J. Etienne, a Catholic priest who has for ten years been connected with leprosy on the island of Trinidad.

"Our whole theory of leprosy rests incontestably on a sad fact," write Danielsen and Boeck, "it is that within the bounds where it commits its ravages, it can be made harmless to the rest of the people only by isolation; to experiment with this scourge on any other theory than this is dangerous; to risk the well being of a whole nation on the supposed truth of any new hatched, unfledged theory is reckless criminality. If leprosy is contagious why are its victims among the white people and foreigners so few? I answer 1, because white people are much more careful than Hawaiians in their choice of companions, and 2, because the whole number of whites in this country is comparatively small."

Hawaii cannot afford to retreat from the advanced position it has taken on this point. The population of these Islands is too small to be trifled with and risked in a wild experiment there is danger, it will be lost in the process. Due consideration for the welfare of our own non-leprous people and that of the increasing num-

ber of visitors and those who seek homes with us, makes it incumbent upon us to cling to the safe doctrine of contagion, which is also the plainly taught doctrine of experience in other lands. The necessity for isolation is a sad fact. Courage is needed in a nation, as in a patient, to nerve it to the dread ordeal of a painful surgical operation. However unwelcome the facts may be it becomes us, as true and honest men, to meet them squarely and not to imagine we can dodge the force of their blow by closing our eyes to the truth.

As to the question whether lepers shall be isolated in branch hospitals or at Kalawao, any one who is acquainted with that district which offers 4,000 or 5,000 acres of fine healthy pasture, woodland and valley, with mountains and ocean at hand, cannot fail to appreciate that the advantages and health giving opportunities of outdoor exercise, recreation and pure air at this place, are tenfold what they ever can be at any hospital located elsewhere. Any plan of treatment which fails to provide an abundant out of door life and exercise in the open air for the leper, can hardly attain success.

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REPORT OF THE PRESIDENT OF THE BOARD OF HEALTH
TO THE LEGISLATIVE ASSEMBLY OF 1884, HIS EX.
WALTER M. GIBSON, PRESIDENT.

OFFICE OF THE BOARD OF HEALTH,
HONOLULU, April 24, 1884.

Nobles and Representatives:

During the biennial period which closed on March 31st last, the following sums have been expended by order of the Board of Health:

	APPROPR'A'N	EXPENDITURE
Leper Settlement.....	\$90,000 00	\$97,640 64
Water Supply for Kalawao.....	10,000 00	205 00
Government Physicians and Medical Treatment.....	50,000 00	54,079.96
General Expenses Board of Health.....	35,000 00	30,773 46
Building and Maintenance of Hospitals...	50,000 00	53,321 30
Repairs and Care Quarantine.....	2,500 00	2,488 20
	\$237,500 00	\$238,508 56

This is a large sum to be expended by the Government of about 75,000 people, for the care of the health of the community; the amount is about 10 per cent. of the whole revenue of this Kingdom.

In this State, it may be said that the Government undertakes the whole charge of the hospital treatment of the sick poor of the Nation. In all other enlightened States, the great work of providing for the indigent sick is mainly undertaken by the charitable enterprise of wealthy members of the community, who combine to found monuments, illustrative of the charitable and liberal spirit of the nation.

It may be said that Hawaii has to meet a calamity of wide-spread disease that would baffle the resources of private benevolence; at least 2 per cent. of her entire population being attacked by a fearful and supposed incurable malady of an exceptional character that de-

mands separation and isolation. She is laboring under a state of suffering that calls for all the energies and resources of the State, and I am warranted in saying that Hawaii has faced her great calamity bravely, and has made a provision for her suffering people that will compare most favorably with the efforts made by any other enlightened State to meet a similar exigency.

The appropriation of \$90,000 for the segregation and care of lepers, though deemed ample at the time it was voted by the Legislature of 1882, yet has fallen short of the demand upon the health authorities. The appropriation was based upon an estimated average of about 700 patients in charge; whereas there have been treated at the settlement for segregation on Molokai and at the Branch Hospital, an average of about 1,000 patients for some time past.

The report of the Marshal of the Kingdom shows that during this biennial period, 777 lepers and suspected lepers have, in accordance with orders from the Board of Health, been arrested and taken from their homes.

Of this number, 531 have been condemned, after medical examination, as lepers, and were sent to the Branch Hospital; while of these again, 365 were sent to Molokai, and 66 were discharged from the hospital on probation; 28 subsequently returning to it.

In accordance with medical opinion and report, nearly all these cases with very few exceptions, or over 90 per cent. of the leprous patients segregated during this period, were cases of several years standing, and evidently should have been segregated during previous periods.

But it is difficult to indulge in any reflection on the action of my predecessors, because the law requiring segregation has not been carried out with rigor.

For what does this law strictly require?

—That men, women, and children shall be torn from their homes, without any provision being made for the suffering and loss that may be entailed. These are

some of the experiences and consequences of the law, that have come under my own observation.

A man upon Hawaii has been suddenly taken away from his house by summary arrest, leaving behind a helpless wife about to give birth to a baby.

With great pain and risk, the devoted wife, determined to follow her husband, has undertaken the journey to the Capital, and the health authorities, unable to resist her appeal as a homeless and friendless woman, after the confinement of her companion, have allowed her to enter the hospital to join her leprous husband, there to give birth to her child.

Again, a woman in the prime of life and activity, yet condemned as an incipient leper, is suddenly removed from her home, to which the husband returns to find his two helpless little children moaning for their lost mother.

Such cases are not only real, but of frequent occurrence.

The law requiring segregation involves immense responsibilities and consequent charges upon the State.

It is not enough to care for a thousand people summarily removed from their homes, but the thousand suffering families affected by their removal demand some consideration also.

In the cases of diseases eminently contagious, such as small-pox, cholera, yellow fever, &c., which run their violent course in a few days all enlightened communities and such as are animated by the most humane spirit, have pursued and could pursue with proper regard to the safety of the community, only one course, and that is prompt and thorough segregation without regard to the individual or family suffering that may follow.

But with regard to leprosy—a disease well defined and recognized and under special treatment in Norway, India and other countries, as in this Kingdom; a disease that will permit its victim to live with ordinary enjoyment of all bodily faculties for a period lasting from five

to fifteen years ; that permits noble and self-devoted persons like Father Damien to serve at the leper settlement, even to assist at the burial of the putrid dead for the past eleven years without scathe ; and that permits the blessed Sisters of Charity at Tracadie, as with us at Kakaako to serve the afflicted with this disease, in every way even to the ablution and bandaging of most abominable sores, and to do all this without taint or injury to their pure bodies. What shall be said of such a disease? Shall it be characterized as eminently contagious?

Such a characterization is entirely uncalled for, is not warranted by experienced medical opinion, and the violent and hasty segregation which it would inspire is a wrong to a suffering community.

But the separation of the leper from the healthy, has been practised in all countries and has, in a multitude of instances, prompted the sufferers from this dread disease to retire into solitude, away from the presence of their fellow men.

The confirmed leper should be separated from the community. But there should be no alarm in consequence of the temporary presence in the street of a leper ; or on account of any ordinary intercourse with a sufferer from this disease.

According to invariable experience in the observance of this disease in this country and elsewhere, such a sufferer may pass the healthy one in the street or frequent the same room with them in the ordinary intercourse of life, or shake hands with others, or even render services to the sound, with no more danger of imparting the malady than may be apprehended from the presence of and intercourse with consumptives under the same circumstances.

However, segregation of lepers having been determined by the law and being proper and even necessary in all confirmed cases, the Board of Health has endeavored to do its duty to the community and to meet the law of the land by carrying out segregation of lepers

to an extent not accomplished by any previous health administration, and it is the purpose of this Board to fulfil its duty to the full extent that may be warranted.

In the estimates the sum of \$100,000 has been placed for the expenses of the leper settlement, which is only \$10,000 in advance of the estimate for the previous period, and as the average increase of patients at the settlement and branch hospital is fully 25 per cent. more than during the previous period, the estimate may be considered deficient. But the expectation of the Board is, that, by increased facilities of transportation and by the increase of the sources of subsistence at the settlement, the cost of its support may be materially reduced without any diminution of the provision made for the patients, and furthermore there is every reason for entertaining the hope that the disease is on the decline.

The condition of the leper settlement on Molokai, and the treatment of its suffering settlers have been variously viewed by different observers, some regarding its condition as a most praise-worthy endeavor to provide for a great public calamity, and others reflecting upon its management as a discredit to our health administration. It is proper here to say a few words in review of the history of the settlement. In January, A. D. 1865, in view of the alarming increase of the disease, segregation of lepers was determined upon by the Government and provided for by law. After a careful search of the group, the district of Kalawao, on Molokai, a territory of about 5,000 acres was selected.

It is a broad and fertile domain bordering on the sea, and its situation is admirably adapted for the purpose. It is completely enclosed on the land side by a towering rampart of precipitous bluffs, over 2,000 feet in height. The broad plain or plateau thus enclosed, and rendered comparatively inaccessible by bluff and sea, presents a variegated surface and is ever covered with a luxuriant verdure. It had been, in time past, the habitation of a numerous population of many thousands of Hawaiians.

according to the indications of ancient cultivation, who had evidently found their subsistence within its borders ; therefore, it might again, become the self-supporting home of a thousand or more people.

To this settlement the sick were at first transported, without other provision being made for them than bare subsistence and such housing as a few grass huts might afford.

The resources of the State at that time hardly warranted any greater charge than provision for the bare subsistence of several hundred people suddenly taken from their homes and isolated from the community. Up to A. D. 1878, the sick residents of the settlement were simply herded and fed at Kalawao, not provided with such necessities as lamp-light, soap and lint, without any means of transportation of their staple article of food which had to be carried by individuals on foot for many miles, and were during all the time, previous to that period, entirely without any medical attendance whatever.

But the Legislative Body of 1878, gave to the condition of the lepers a special attention. Large sums for their treatment and care were appropriated, and the health authorities consequently provided improved dwellings, additional and more varied food, with lamp-light and other necessities to improve the condition of a sick and isolated community ; so that the contrast of the earlier condition of the settlement with the present is very great.

The segregated people are now lodged in convenient and tight board houses, the supply of food is ample, and the conditions of living at the settlement in neat cottages surrounded by pleasant grounds and fruitful gardens, would be attractive were it not for the presence of the dread disease.

But this calamity has been greatly mitigated, and a comparison of the rates of mortality at the settlement for a period of two years, as shown in the appendix, will prove that the conditions of living of the lepers at

the settlement have been improved and their lives consequently prolonged.

The looker on at the present time and any one who confines his vision to what is before him without considerations of antecedent and other conditions, may find occasion to criticize and complain. Such complaint is to be found in the statement of Dr. Stallard, a visitor to these Islands whose report is annexed. The report of R. W. Meyer, Esq., the superintendent of the settlement, fully answers all the statements of Dr. Stallard. The complaint of Dr. Stallard is based upon his opinion of the need of a general medical inspection, which he proposed to supply. Such general medical inspection I deem advisable, not only for the leper settlement but throughout the Kingdom.

The Board has, during this period, increased the staff of resident physicians from seven to nineteen, as shown by an appended list. Every district is now provided with a physician subsidized by the Government, in order to supply a gratuitous medical attendance for the sick poor; and this medical duty, in accordance with the requirements of the Board, is faithfully performed by some of the resident physicians, but is said to be neglected by some, and a conscientious medical inspection would prevent frauds upon the public purse and wrong to the suffering poor.

The Board has had in view such medical inspection ever since the large increase in the number of the medical employees of the Government, and aims to have it established.

The report of the visiting physician, Dr. Fitch, of the leper settlement, also annexed, coincides in many particulars with the critical view taken by Dr. Stallard, and I regret the tone and tenor of his report, but the Board has deemed it proper to present to you the different medical opinions that have been laid before it upon our health administration.

THE SISTERS OF CHARITY.

Whilst the Board has devoted its attention to the increase of medical skill in behalf of the sick poor of the community, it has also appreciated and given a large share of attention to the incalculable value to be derived from the faithful nursing of the sick, especially by a class of noble self-sacrificing ladies known as Sisters of Charity.

In January of last year, I addressed a letter (annexed) to His Lordship the Bishop of Olba, asking his co-operation with the Board, and to meet an especial wish of Their Majesties the King and Queen, to induce ladies of the charitable Sisterhood to come to the help of the sick of this Kingdom. The worthy Bishop promptly responded to this appeal, and designated the Rev. Father Leonor as a proper agent to go in quest of this exceptional aid. His Majesty was pleased to confer a special commission upon Father Leonor, who, after arduous endeavors and many disappointing appeals had a favorable response from the Order of Franciscan Sisters, established at Syracuse, in the State of New York. Seven ladies of this Order arrived here by the "*Mariposa*," on November 9th, A. D. 1883, four of whom under a Mother Superior, are in charge of the stewardship of the branch hospital and three in charge of the new hospital at Wailuku, named *Malulani*, by the Princess Liliuokalani, and which is under the special patronage of Her Royal Highness.

The good sisters repeat here their wonted faithful and good work done elsewhere. The patients are loud in praise of their ministration, and it is confidently hoped that the nursing care of the Sisters will prove the immense advantage to be derived from favorable sanitary conditions and improved diet, especially in the case of the unfortunate lepers.

So it is hoped that Hawaii may yet derive a blessing from the great misfortune, by providing for it in the spirit of an enlightened and generous philanthropy, and

by proving to an observant world, that the care of the unfortunate and the appeals of humanity have a paramount influence in the councils of the nation.

In respect to the nursing of the sick, I am pleased to have to state that the Lord Bishop of Honolulu, Right Rev. Dr. Willis, has communicated to the Board a proposal that the Sisters of St. John, of England, should come to the assistance of the sick of the Kingdom.

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The humane and enlightened attitude of Hawaii is respected throughout the civilized world, and her position calls for continued sacrifices and greater activities. We must take an active part in researches to examine into the sources of diseases which attack us, and to find means for their mitigation.

An enlightened and philanthropic body of Germany has sent to this Kingdom a medical gentleman, Dr. Arning, of eminent reputation, and well qualified to study the *arcana* of a disease which though not afflicting Germany, yet calls forth her sympathetic, humane spirit. The Board of Health has provided for half of the emolument of the physician who is making these important medical researches, some results of which appear in a valuable report annexed.

I beg to urge that Hawaii take a larger part in the pursuit of such researches. She is attacked by a terrible enemy. Let her study everything pertaining to its origin, resources, and favorable conditions. Leprosy has, at times, attacked every race in the world; but its chief abiding places have been parts of Asia. Some of the islands of Malaysia have also been fecund hot-beds of the fell disease. In Java, and other islands of the great Archipelago, where the natives present most striking affinities with the Hawaiian race, the diseases that afflict them also afflict the Hawaiians. The Javans treat as outcasts all who are suffering with the *kudig*, or leprosy, and the unfortunate ones have voluntarily segregated themselves upon small islands, where they are supplied with the means of subsistence by their friends.

I think it would be well that the disease which commands so large a share of public attention, and calls for so large an appropriation of the public revenue should be studied by competent authorities under Hawaiian auspices in various parts of Malaysia and Polynesia, where it is found ; and let Hawaii continue to maintain her honorable and enlightened position in Oceanica by her advanced philanthropic enterprise.

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COPY OF LETTER TO THE BISHOP OF OLBA.

OFFICE OF THE BOARD OF HEALTH,
January 4, 1883.

THE LORD BISHOP OF OLBA.

My Lord:—The care of the sick and poor of this Kingdom, is a subject that has most earnestly enlisted the sympathies of Their Majesties the King and Queen, and awakens the solicitude of His Majesty's Government.

I have long entertained the view that, in order to combat more successfully the various maladies that beset the people of this country, especially His Majesty's Hawaiian subjects, it was not alone sufficient to have skilled physicians and ample supplies of valuable remedies ; but it was still more important to have trained and faithful nurses, and I felt that nowhere could this invaluable assistance be obtained so readily as among the blessed Sisterhoods of Charity, who have, in various parts of the earth, devoted themselves to the care of the sick. I submitted a proposition to the Board of Health that I be authorized to invite ladies of such Sisterhoods to come to this country to aid in the sanitary care of the people ; and provide for their traveling expenses and subsistence, and I am happy to state that I have full authority to invite eight or more Sisters of

Charity to come to the rescue of our sick people, for whose traveling expenses in first-class condition and for whose lodgment and subsistence I can provide out of appropriations for "maintenance of Hospitals," or "General Expenses of the Board of Health."

Now, my Lord, as I am aware that eminent institutions of Charity, such as I have referred to, and which this country needs, abound in the Catholic Church; and as I feel assured that your representation of our needs would be all influential, I make an appeal, and offer invitation through your Lordship to Sisters of Charity of the Catholic Church to come to the help of the sick of this country, and I doubt not I may proffer to them in advance the profound obligation and gracious recognition of their Majesties, the thanks of His Majesty's Government, and the blessings of the Hawaiian people.

I have the honor to be, my Lord,

Your most obedient servant,

WALTER M. GIBSON,
President of the Board of Health.

GENERAL REPORT BY DR. FITCH, 1884, TO THE HONORABLE BOARD OF HEALTH.

* * * * *

At the Branch Hospital for the reception of lepers, there have been 531 patients received; 37 have died; 365 have been consigned to Kalawao; 66 have been discharged on probation, of whom 28 have been re-confined; 3 have died while absent from the hospital—leaving 35 out on leave of absence for ten days at a time. Of the 66 out on leave of absence, the petitions to the Board of Health, asking for the discharge of the patients so liberated, have been signed by Drs. Trousseau, Hagan, Rodgers, Arning, McKibbin, Parker and Fitch,

Whether the medical men other than myself considered that the cases they recommended for discharge from the Hospital were cured, improperly received, or why they joined in asking the discharge of such patients, I do not know.

Four patients only have been admitted to the hospital on my individual responsibility. Of these four, one is dead, two remain in the hospital, and one is included in the list of those out on leave of absence. During the four months in which I have acted as one of the Examining Board in conjunction with Drs. McKibbin and Trousseau, it was fully understood that two of the Board must agree that the person examined was a leper before they could be admitted to the hospital. This understanding was, to the best of my knowledge and belief, fully carried out. The four I admitted came in before I was a member of the Board of Examiners.

During the last quarter we have had the services of the Sisters of Charity in nursing the sick, and only those who have seen the devotion of these noble women to their work, and the blessed results of their labor, can form any conception of the worth of their efforts to the poor suffering creatures in their charge. I trust the branch hospital, under their ministrations, will prove a haven and shelter to some of the most unfortunate of mortals.

Before their arrival, Mr. Van Giesen had the entire nursing, providing for and watching over of this extensive hospital, as well as the construction of the buildings and filling the yard, the compounding of drugs and taking photographs, as well as keeping the books and records. How he ever accomplished the work he did has been to me a constant source of wonder.

But no one man, however faithful, can do the work which a large number could well have been employed at, and the coming of the Sisters has been a great relief.

Only the kindly, gentle nature of the native race has enabled us to get along as has been done.

I trust that the condition of the hospital will be found

very satisfactory. The unfortunate situation of the institution cannot be better shown than by stating that during the great southerly gale in December last the tide backed into the yard to the depth of nearly three feet, there not being a dry spot in the enclosure, and only the most strenuous exertions of the steward and the inmates saved the place from almost complete destruction.

The site is most wretchedly chosen, and should be abandoned.

But while the condition of Kakaako as to nursing and care and food has been, to some extent, satisfactory, Kalawao has been directly the reverse.

For nearly eighteen years that place has been the chosen spot for casting out to a lingering death many hundreds of the most unfortunate of earth's suffering mortals. In addition to the inevitable suffering which is the constant feature of leprosy, no care has ever been exercised to make the condition of lepers even tolerable.

But some may ask—if I see such cases, why I do not remedy them? I only wish some good genius would tell me how it could be done. Let me give ever so many orders to rectify this wrong or that, who is to carry my orders out?

At best, they are only given to poor, sick, miserable creatures as unable to care for themselves as they are for others.

And the Board of Health are just as powerless as I am in this matter. Who will volunteer to go there to act as nurses? What wages would hired nurses ask to do such work? There are an average of 750 patients there, and they are scattered over near three miles of territory; what an army it would take to make things *even tolerable*. As to the *kokuas*, or native nurses, who are there, the most of them are there to live off the rations provided by the Government for the sick, and, as a rule, only add to the unparalleled licentiousness of that hideous brothel. Some work they do; but when

it comes to systematic care of sick people, they are thoroughly worthless.

* * * * *

But finding fault with the past is useless unless it lead to good results in the future. What can, what should be done, to correct these terrible wrongs? My plan would be to procure a suitable place, not less than five nor more than ten miles from Honolulu, to embrace at least fifty acres of land, having suitable natural drainage, with water supply in abundance, and then make a perfect enclosure, divided into separate yards for the separation of the sexes, the light from the bad cases, and where the viciously inclined may be held in control. Then, by putting say 30 or 40 patients under the charge of a Sister of Charity, to be watched over and attended to, and as soon as a case needs more care, have the patient removed to a central hospital where good order, cleanliness and as much comfort, if such be admissible, as the disease permits its victim to possess would be had.

* * * * *

But when I ask to have the sexes effectually separated, I ask what common business prudence only suggests. Separation of the sexes is an absolute physical impossibility at Kalawao, with the power at the command of this Government.

It is an unalterable law of nature that the unclean cannot give birth to the clean, and in consonance with this law, we find that after eighteen years existence of the leper settlement under the conditions I have already mentioned, there are now there 19 living children born of leper parents at the place, and 32 children born of leper parents outside, who have gone there to reside with those parents. Some, besides, whose mothers or fathers, after the birth of the child, have married lepers, have gone also. Furthermore, there are 35 *kamainas*, whose lands have not been condemned, who are living there surrounded by and in continual intercourse with lepers for the last ten years; besides, from the very

first, numerous *kokuas* have been permitted to live there. And yet this has been called segregation; and there is a political party here who established the place, and whose war cry is: "We will never give up until every leper in the Kingdom is sent to Kalawao, and thus the land become clean."

Verily, sending hundreds to a leper manufactory to establish cleanliness in the land is practising segregation and encouraging virtue, with a vengeance.

Yet, to appeal to those who, through the press and by word of mouth, have established this order of things and now clamor loudly for its continuance, is hopeless.

* * * I do not ask to make segregation less perfect; on the contrary, I ask to establish a segregation—which never has existed—and as a first condition and a necessity, I ask the chance to make segregation possible.

No one will willingly consent to have loved ones removed from them to suffer under such a state of affairs as has existed from the start at Kalawao, nor should they consent. No person with a disease as loathsome as leprosy has any right to be at large in a community; and while I do not believe leprosy a contagious or infectious disease, I do believe every leper should be segregated; but while matters are in the condition I have shown, it must be clear that to practice segregation, or carry it out efficiently, is about as severe on those having the matter in charge—providing they have any humanity about them—as it is on those to be segregated.

To show how this matter of segregation has been managed in the past, I submit this statement:—

Kakaako was opened for the reception of patients on December 12, 1881. Previously to that time, Kalawao had been in existence as a leper retreat for more than fifteen years. During this period there had been 2,499 persons sent there—or an average of 166.6 per year. Kakaako received from December 12, 1881, to June 1, 1882, 103 patients; or, adding to this the former number for the first near sixteen years that segregation was

said to have been so efficiently carried on here, 2,602 cases—an average of 162.62 cases per year. From June 1, 1882, to April 1, 1884, 427 patients were received at Kakaako, and a number went to Kalawao direct. I do not know just the exact number, but we shall be safe to say that for the twenty months named the number of 450—or an average of 200 per year. Comment on this showing would be superfluous. For the first year after my work at the dispensary began, new cases of leprosy were constantly coming in for treatment.

For the last year few cases have come in. I am fully convinced that during a year last past not a dozen new cases have made their appearance in Honolulu. In fact, I fully believe that before the expiration of another biennial period every one will be able to see that this dread scourge has spent its fury. God grant that day be dawning indeed, as I fully believe it to be in this regard.

EXTRACTS FROM REPORT OF J. H. VAN GIESEN, 1884.

Improvements have been made since my last visit, nearly one year ago. There is no actual want, nor much misery; the patients are gradually getting their little homes, patches of potatoes, and becoming “kuo-noono.” The water-pipe and harbors I would recommend to your attention. I spoke to Meyer about the harbor, and he said he was going to do something during the coming April. Meyer is a very conscientious man, and evidently thinks he is doing what is right; but he is at the settlement so little of his time that he has not a good idea of what is going on. In speaking with Meyer, he said he did not have charge of the settlement—was only agent for the Board of Health.

There is no necessity to have a doctor. What is wanted is more nurses; houses should be kept more clean, more whitewash used. The lepers themselves will not do this unless there is some one present to compel them to do it. The supply of provisions and furnishing seems to be tolerably good; the main trouble lies in not having regular and direct communication when and where required. Meyer has bought a German surf boat, now lying at Kaunakakai, and is going to have her painted and placed on the pai-ai route; but this is hardly the thing. Would advise the immediate purchase of a water pipe, and have it laid by leper and kokua labor. The old pipes could be taken up, and new couplings made and used for branch pipes; at present it is a wonder that any water is obtained at all, the way they have tied up with old rags the places that are broken. The lepers who have come with me are perfectly satisfied with the place, and have selected their future house sites. They, on their return, will tell others, so that I can predict, when the pipes are laid, nearly all, if not all now at Kakaako will be willing, if not beg, to go to the settlement. Would advise to let them go with their wives and husbands, but no children. By doing this, a home feeling will be promoted, and a better state of morals kept up; they will be more quiet and contented, and the best nurses will, in this manner, be obtained.

DR. ARNING'S REPORT, 1884.

To His Excellency Walter M. Gibson, President of the Board of Health.

SIR:—I have the honor to submit to Your Excellency a report on my work in connection with leprosy, carried on during my stay on these Islands.

After my arrival, about the middle of November last

year, and pending the erection of a suitable locality for carrying on my work by the Government, I endeavored to inform myself on the different views held in regard to the disease and the modes of dealing with it.

Several things at once struck me very forcibly. Firstly, that I had either been misinformed by an excellent authority on an exceptional degree of malignancy which leprosy showed on these Islands, or that this malignant type and quicker course of the disease had, with the more general spread, gradually given place to the eminently chronic character, which it exhibits in its older and established domains. My informant was Dr. Hillebrand, and he wrote to me from his experience, gathered more than fifteen years ago; that on these Islands, and at his time, leprosy killed its victims within three to five years, whereas I now find the average run of a case of leprosy is between five and ten years. It will, of course, be extremely difficult to get at exact numbers in this respect, as leprosy is not a disease where we are able to fix a well-defined time of commencement; but we shall have to attach value to such a statement by an intelligent observer, even without its being based on statistics, and infer therefrom that leprosy actually exists in a milder form than it did during the first decades of its spread on these Islands.

I was further surprised to find it accepted on some parts that the disease is a certain form or stage of syphilis—*i. e.*, is in every case dependent on previous syphilis, and if at all communicable, could only be transferred by syphilis.

I avow that this hypothesis, which, if true, would entirely overthrow our hitherto accepted ideas not only of leprosy, but still more so of syphilis, seem to me to be so extraordinary and self-condemning that it would scarcely necessitate my entering on the subject in this report; but, on the other hand, the theory has been most energetically brought before the public and found believers, so that I consider it my duty to support with the full force of my opinion the endeavors of other

members of the medical profession who have already some time ago refuted this idea. The theory is, perhaps, not quite as harmless as many would believe, as it has led, and may further lead, the public to consider leprosy as an outcome of licentiousness, which term certain classes of society unhappily seem to use as a synonym of syphilis, and to look upon the unfortunate lepers as the victims of their own or their parents' transgressions.

Singularly enough, it never seems to have struck the promoters and believers of this theory that in its impliedly given the clue to the cure and eradication of leprosy.

If leprosy be the outcome of syphilis, then all our efforts should be directed towards the latter, which happens to be one of the diseases most amenable to treatment; then all the laws and regulations of private and public sanitation should aim at the prevention of the spread of syphilis; then we should segregate all persons suffering from syphilis, and have syphilis settlements instead of leper settlements.

I will not go into the details of the difference of syphilis and leprosy in clinical and pathological aspect; but I wish it to be understood that neither clinically nor pathologically does the leprosy of these Islands present any peculiar feature or combination of symptoms which any physician accustomed to see and treat syphilis would recognize as belonging to the latter. Moreover, I am led to believe from what I have observed here myself and gathered from other physicians, that syphilis is not nearly so prevalent here as has been generally stated. An inquiry on this subject, issued by the Board of Health, would, perhaps, recommend itself, and very likely lead to a correction of the general opinion in this matter.

It is evident that one case of leprosy brought on in a subject where there is no trace either of hereditary or acquired syphilis will overthrow the theory of the unity of the diseases, even if hundreds of cases could be

brought forward where there is a history of previous syphilis. I have already been successful in collecting such evidence.

In the beginning of December I could start my microscopic work. I was then able to prove the presence of the same micro-organism which Hansen and Neisser first demonstrated in leprous tissue, and which which has received the name of *Baccillus Lepræ*. I have now examined leprous tissue from Norway, Spain, Syria, Surinam, and these Islands, and find the same changes due to the invasion of the same germ. At first I was baffled in my attempts to find the bacillus here. The delicate manipulations you have to apply to the tissues in order to show its presence seemed to work differently here than at home, but by varying the methods I have succeeded. Following up the spread of the bacillus in the various tissues gained from three post-mortem examinations—(two at Kakaako and one at Kalawao)—and by excisions of tubercles from the living, is at present the chief work I am occupied with; the aims are manifold. Firstly, to gain knowledge of the paths the germ follows in the organism, and the changes it brings about in the tissues of the body; then to gather information as to the life history of the germ itself; and last, but not least, to see to what extent the presence of the baccillus can be used as a practical test for leprosy.

With regard to this latter proposition, I am able to say distinctly that I have found the baccillus in every case of tuberculous leprosy I have examined, and that it cannot be found in any other disease. As yet, I have not been able to prove its presence in the blood or in the spots and sores of anæsthetic cases. In these cases I believe I shall find the baccillus in the nerves supplying these parts with vitality, and I have good reasons to hope that I soon shall be able to publish proofs of this opinion.

I have further extended my microscopic examinations to other diseases which have of late been attributed

to the invasion of a healthy organism by parasitic germs. In three cases of consumption occurring amongst natives, I have found Koch's bacillus tuberculosis; likewise in gonorrhœa and pneumonia the same germs that have been proved to cause these diseases in Europe. Nor have I failed in detecting in various skin diseases the itch, the white *kane* spot, and the *puupuu*, which are so prevalent amongst the natives, the same closely allied animal and vegetable parasites which are known to produce corresponding diseases in other countries.

A current belief that leprosy has been extensively propagated by careless and indiscriminate vaccination, induced me to try and vaccinate lepers with a view of possibly finding the germ in the pustule. Unluckily, although I tried to procure the best lymph, the vaccination did not take in any one of the cases. The experiments will be repeated with new lymph I have ordered.

Inoculation of leprosy on all sorts of animals—dogs, cats, rabbits, guinea-pigs, birds, and fish—has of late been perseveringly tried by quite a number of authorities, so far without result as regards general infection. I have procured a monkey for carrying on these experiments.

With a view to ascertain what becomes of the millions of germs a leper harbors after his death, and whether there is a possibility of their infecting the soil, I have, on a visit to Molokai, caused a grave to be opened in which a leper had been buried a year ago. A portion of the crumbling dust was removed, and will be examined in due course.

My time during the next six months will be chiefly devoted to cultivation experiments—*i. e.*, to try and grow the *Bacillus Lepræ* on specially prepared substances outside of the human body. This work is of the most tedious and delicate nature, and always associated with many discouraging failures; but, nevertheless, it has to be undertaken, forming an essential part of the modern methods of investigating disease.

As regards treatment of the disease, *I consider it altogether unwarrantable to call leprosy incurable*, and simply to remove the afflicted out of sight. This is a remnant of mediæval barbarism which every professional man ought to oppose, more especially so in our relation to a race which has had our civilization forced upon it, and which is accustomed to look up to us for help and support. Is it not fostering their innate sense of indifference to hygienic principles, instead of setting them a fair example, when we gather together very nearly a thousand suffering people in a lonely spot, and let them have only a flying visit of a doctor once a month. We medical men consider it one of the foremost principles of our work to grapple with disease to the very last; and if even in acute cases, where we see death imminent, we think it right not to give in, but to try and stay the fast ebbing current of life; then much less should we leave fellow-creatures suffering from an eminently chronic disease to succumb gradually, without even an effort to help them.

And for the nonce, even accepting the oft-repeated assertion, that both history and personal experience show us that we have to deal with a disease which we are not able to arrest by general treatment; there will be work enough in store for us to help these outcasts through other troubles not in direct relation to leprosy. But we ought never, for a moment, to accept the saying of the incurability of leprosy as true; but ought to go on fighting against it. Perhaps we have been on the wrong track of treatment, and there is yet a solution of the problem to be found. The recent experiments concerning the germ nature of the disease may be the means of showing us the path of rational treatment; and they must and do give a new impulse and new encouragement to us to persevere in trying and experimenting. But then we must not expect to find an arcanum, an oil or extract with very nearly supernatural qualities, as has only too long been done in connection with this most intractable disease; but must act system-

atically on a rational basis, individualizing the cases and trying to benefit them by saving what can be saved of their vitality. And then there is a vast field for local surgical treatment, apart from general medication. What should we think of the surgeon who would leave large ulcerating surfaces and sores without attempting to heal them, or would not timely remove a bone which is mortified by *Syphilis* or *Tuberculosis*, and is keeping up painful and detrimental irritation, and should it be otherwise in leprosy? Why are we entitled to leave scores of leprosy eyes to decay and waste away, while there is a chance of saving, if not at all, at least a part of them, by skillful surgical interference. One of the most common operations in ophthalmic surgery, is for an inflammation of the inner eye due to syphilis, and by it hundreds of eyes are saved. And for a similar inflammation occurring in leprosy, we should do nothing but stand and watch blindness slowly but surely coming on.

I find there is no foundation in saying that lepers will not stand surgical interference. Excisions of tubercles and excision and stretching of nerves have been performed by me, and the wounds healed as readily as in other individuals.

Besides this there is another potent agent which ought to be extensively applied in treating this disease, viz: electricity. I have, in two cases, by a three months' course of electrical treatment, been able to restore, in a marked degree, the muscular power of withered leprosy hands; and I know of other cases where this treatment has been similarly efficacious.

I think it is self-evident that any bacterial disease is more likely to be successfully combatted in its initial stages, before the organism has lost its power of resistance and recovery, and we ought, therefore to look out for cases presenting the very first symptoms, especially in children and young people.

That there are numerous such cases amongst the rising generation, no one, who has paid any attention to the

question, can deny. I had, before the official examinations of the school children were ordained, examined two of the schools in this city; and found, in one of them, amongst ninety-five scholars, five; in the other, amongst 15 scholars, three cases of initial leprosy; which would be a ratio of 7.27 per cent. I then and there advised these patients to be removed from the schools; since then a few more cases have been removed by the examining physicians. What strikes me as particularly necessary at the moment, is to provide suitable accommodations for these children. It seems to me to be perfectly unjustifiable to take these children out of the schools on account of the danger of their communicating the disease to their school-mates, and to cast them back on their families. The danger to the community is not lessened in the least. These are not such cases as have hitherto been segregated as confirmed lepers; indeed, some of them appear to be, otherwise, in splendid bodily health. And surely it would be more conducive to their maintaining this general good health, if they could be kept in their regular training with its beneficial influence on the mind and body, instead of idling away their time at home. We require a home for these children where the regular school training is kept up as far as possible; where there is a reliable person to look after them and see that the orders of the attending physician are carefully carried out. This home ought to be as cheerful a retreat as possible, in a healthy location, where the inmates can roam about within certain limits, and where there is plenty of good food and air. Decidedly advanced and bad cases ought to be kept entirely out of sight of these children.

I will not dwell in this report, on the merits and drawbacks of the Molokai settlement and the branch hospital at Kakaako, as they present themselves, to my opinion, but I believe that instead of enhancing it these two institutions detract from each other's value, and

that this condition will last as long as Kakaako is kept up as an over-crowded leper settlement.

It will be seen from the foregoing, that I advocate segregation; and I may be asked first to prove the actual power of contagion in leprosy. To this I reply: that from what we already know of the nature of the disease, we are entitled to enforce segregation; even without the question of actual contagion being definitely settled. We know that leprosy is dependent on the invasion of the human body by a microscopic germ which has the power to increase indefinitely in the tissues. Therefore we must look upon every single leper as a hot-bed of disease, quite independently of the exact condition under which he can transmit it to others. He, at any rate, breeds and multiplies a poisonous germ; and is, on this account, dangerous. A similarly infested locality we would hasten to quit, as we are not able to remove it from us. But in the case of leprosy, which is bound to individuals and not to localities, it is more expeditious to remove the infected individuals from the unaffected members of the community.

Hoping that Your Excellency will favorably consider this report, and the views and suggestions therein contained, I remain, yours most respectfully,

EDWARD ARNING, M. D.

Dr. W. Hillebrand, a former resident of these islands, and very highly esteemed in this community, called the attention of Mr. Gibson, President of the Board of Health, to the importance of the Government engaging the services of Dr. Arning in a letter, dated Montreux, Switzerland, Dec. 16, 1882, from which are extracted the following valuable and interesting statements:

“That in consideration of the important results for the welfare of Hawaiian people, which are likely to be derived from the intended investigation on the contagium of leprosy, the Hawaiian Government declare itself ready

to assist Dr. Arning, either by a direct grant or otherwise." "The sum in question is very moderate, simply large enough to cover the expense of living on the Islands for the space of nine months. I imagine that you will be justified to set aside a small portion of the money appropriated by the Legislature for sanitary purposes. If not, you can appoint him physician to the leper settlement, where Dr. Arning will be obliged to spend the greater part of his time.

In order to impress you with the importance of the results which may flow from an investigation of this kind, I shall have to say a few words of its character and range. It will not be confined to inoculation of animals, but will extend over all the possible bearings of the contagium. The germ will be propagated outside of the human body, cultivated in breeding stores of particular construction, in liquids of different chemical constitution. If inoculation succeeds in the first instance, it will be repeated with the germ modified by these measures; to learn if they lose or increase in power, for as it may be taken for granted that simple contact with the leprous tissue of the living body does not communicate the disease, it is to be presumed that under certain unknown conditions, probably outside of the human body, the germs acquire an unusual energy, under which they develop their contagious quality. For this purpose the soil of the leper graves will have to be examined; houses which have been inhabited by lepers, or in which the disease is known to have taken its commencement, will have to be searched for extra corporeal breeding places. I will only refer here to a popular belief prevalent in southern China, that the disease spreads from the decomposing urine of lepers. The history of individual cases will have to be followed up with a view to all the possibilities which modern research of other disease germs has revealed.

Some startling discoveries, which at the same time open quite good views; have of late years been made with regard to the germs-bacteria of that most deadly

disease called malignant carbuncle. These are now proved to be identical with the innocuous bacteria which stick to dried grass or hay, and are present abundantly in the lower strata of the atmosphere in all countries covered with vegetation. These latter have been converted into deadly poison by successive breeding of generation after generation in solutions with gradually increasing proportions of albumen, and vice-versa. The former have been converted into innocuous hay-bacteria by breeding in solution with gradually diminishing albumen. A similar relation is supposed to exist between the germs of variola and vaccine although the proof has not been furnished yet.

That from researches of this kind finally must result a true knowledge of the natural history of that vegetable organism which originated the disease called lepra, is self evident. The only question is, after how many years? At the same time, it is evident that the knowledge of its natural history—and only this—will point out with certainty, the sanitary measures which are to be adopted toward warding off the disease preventing its spread and, I do not hesitate to say, finally affecting its cure.

Probably you have read in the papers of the discovery by Dr. Koch in Berlin of the bacteria which cause tuberculosis of the lungs, consumption, well, he has demonstrated by exclusive experiments, not that the disease is inoculable—for that discovery had been made before him—but that the bacteria are the sole carriers of the disease, and that they are present only in the tubercular deposit, not in the blood. In no sputum of a tubercular lung are they wanting, and from the dried sputum they pass in the atmosphere of confined rooms, where they may, but need not necessarily, become propagators of the disease, for they require a temperature of at least 40°C . in order to live and propagate, you will see at a glance, what a hopeful field this knowledge opens to preventive measures against the spread of this dreadful disease.

On the other hand, the germs being confined to the lungs, at all events in the earlier stages of the disease, this has to be attacked by local means, inhalation and inflations. And as known already an organicide which kills the microcoecus cell in the case of malaria without damaging the blood-cell or globule, the source of human life, why should one despair of finding a corresponding remedy in the case of tuberculosis or lepra?

The foregoing remarks will convey to you, my dear sir, a due appreciation of the importance of the work, and also of the difficult and complicate nature of the investigations. Only men in possession of all the specific knowledge obtained thus far, experienced in the use of the microscope and practically trained to the different methods of experimental research are competent to undertake it. Such a man offers himself to you, commissioned by one of the highest scientific bodies, from no motives of gain but prompted by the simple enthusiasm of science and philanthropy.. I am sure that you will not grudge him the very small contribution which is needed; 1,500 to 2,000 dollars will cover the whole expense, I should think. The French Government has assisted Mr. Pasteur to the extent of over 100,000 francs during the last two years, to enable him to carry on experiments tending to impart to sheep immunity against a contagious disease. How much more cogent reason to assist experiments tending to the salvation of a nation of men?

OFFICE OF THE BOARD OF HEALTH,
HONOLULU, February 1, 1883.

DR. HILLEBRAND,

Montreux, Canton Vaud, Switzerland.

DEAR SIR:—I have received and read with the greatest interest your letter of 16th Dec. ult., in which you inform me of the mission Dr. Arning desires to undertake to this country, and of the aid he may require, and

of the nature and importance to this country and to science, of the work he will undertake.

It gives me great pleasure to be able to assure you at once that if Dr. Arning comes here for the purpose of studying the natural history of the contagium of leprosy, he will receive from the Board of Health every assistance they are in a position to give him in the way of premises and facilities for carrying on his investigations, together with a salary as a physician under the Board, during the time he is thus occupied, of say \$150.00 per month. For the purpose of giving him full opportunity for research, he may, at his choice, find a place on the medical staff either at the branch hospital at Kakaako or at the leper settlement.

An investigation by a competent person of a nature such as Dr. Arning desires to engage in, is a matter that I have long desired to see taken in hand, and the Board has been anxiously considering how so desirable a work could be carried out. Dr. Arning may therefore feel assured, that if he comes here for this purpose, he will receive the cordial and earnest co-operation of the Board.

Accept my thanks for the interest you have taken in this matter, and for the instructive letter you have favored me with. It gives me personally the greatest pleasure to be able to respond to your suggestions with prompt compliance.

I remain, dear sir, yours sincerely,

WALTER M. GIBSON,
President of the Board of Health.

AMENDMENTS TO THE ACT TO "PREVENT THE SPREAD
OF LEPROSY."

Sections 5 A and 5 B were amended by Act of 1870,
Ch. XXXIII, to read as follows:

SECTION 5 A. No person, not being a leper, shall be allowed to visit or remain upon any land, place or inclosure set apart by the Board of Health for the isolation and confinement of lepers, without the written permission of the President of the Board, or some officer authorized thereto by the Board of Health, under any circumstances whatever, and any person found upon such land, place, or inclosure, without a written permission, shall, upon conviction thereof, before any police or district justice, be fined in a sum not less than ten nor more than one hundred dollars for such offense, and in default of payment, to be imprisoned at hard labor until the fine and costs are discharged in due course of law.

SEC. 5 B. It shall be lawful for the Board of Health, through its president, to make and promulgate such rules and regulations as may be from time to time necessary for the government and control of the lepers placed under their charge, and such rules and regulations shall have the same force and effect as a statute law of the Kingdom; Provided, alway, that the sanction of the King in Cabinet Council, be given thereto, and that they be published in two newspapers, published in Honolulu, one in the Hawaiian, the other in the English language.

Section 6 repealed 1874. Chapter XI.

SEC. 300. It shall be the duty of every physician having a patient infected with the small-pox, or any other disease dangerous to the public health, to give immediate notice thereof to the Board of Health, or its nearest agent, in writing, and in like manner to report to said Board, or its agent, every case of death which takes place in his practice, from any such disease; and every physician who shall refuse or neglect to give such notice, or make such report shall be fined for each offense a sum of not less than ten, nor more than one hundred dollars.

SEC. 301. It shall be the duty of every householder

keeper of a boarding or lodging house, or master of a vessel, to report immediately to the Board of Health, or its nearest agent, any person in or about their house, or vessel, whom they shall have reason to believe to be sick, or to have died of, the small-pox, or any other disease dangerous to the public health, under a penalty of not less than five, nor more than one hundred dollars for each offense.

AN ACT TO AMEND SECTION 4 OF CHAPTER 62 OF THE
PENAL CODE.

Be it Enacted by the King and the Legislative Assembly of the Hawaiian Islands, in the Legislature of the Kingdom assembled:

SECTION 1. That Section 4 of Chapter 62 of the Penal Code be and the same is hereby amended so as to read as follows:

“SEC. 4. The Board of Health is authorized to make arrangements for the establishment of hospitals on each island where leprosy patients in the incipient stages may be treated in order to attempt a cure; and the said Board and its agents shall have full power to discharge all such patients as it shall deem cured, and to send to a place of isolation contemplated in Sections 1 and 2 of this Act, all such patients as shall be considered incurable or capable of spreading the disease of leprosy.”

SEC. 2. This Act shall become a law from and after the date of its passage, and all laws in conflict with the provisions of this Act are hereby repealed.

Approved this 11th day of August, A. D. 1884.

KALAKAUA, REX.

CASES RECORDED AT KAKAAKO.

The following are taken from a record of cases preserved at the Branch Hospital, Kakaako, during the years 1882 and 1883:

KINE.—Female; aged 18; sick 4 years. Is the last born of 17 children, all dead, by a strong, fat, short mother and tall; slim father, both living. Has lived and intermingled with lepers, but none of her relations, as far as she knows, are yet lepers.

KAMALUNUI.—Male; aged 24; sick 4 years. Is the eldest brother of another leper at the hospital, that is a half brother, by the same mother and a different father. There is also another older brother, a confirmed leper on Molokai. Is one of 12 children by two fathers from same mother. These children from both fathers show the same tendency to leprosy as if they had only one. There are only four boys now living and three of them show signs of leprosy. The remaining brothers and sisters all died from a few days after birth up to six months. The present case has lived, ate and slept with lepers.

KAPAHI.—Male; aged 29; sick two years. Mother and younger brother a leper.

KALEMANA.—Male; aged 42; sick 1 year. No leprous relatives, but has lived with the disease.

KALANIMEA.—Female; aged 23; sick 2 years. Second child of apparently healthy mother and weak, sickly, asthmatic father. When young much subject to large scaly eruptions on body and head. Led a dissolute life, with usual results. Has lived with adopted mother, who was a leper, who fed her from her own mouth (pu-a). Three of her own uncles on mother's side have been lepers and sent to Molokai.

KAHOE.—Female; aged 23; sick 18 months. Had lived, ate and slept together with her mother-in law who was a leper.

KANA.—Female; aged 16. First of two children by small, thin mother; father died when she was young. Grandmother on father's side was a leper at Kalawao. Patient had not lived with lepers to her knowledge.

LUAHIWA.—Female; aged 14; sick 1 year. Is second born of 11 children by tall, slim mother and short, thickset father, who denies that any of the family or relations ever had leprosy or had resided with it.

KEKUL.—Male; aged 25 years; sick 2½ years. Father died at Molokai a leper. The other children do not yet show symptoms.

KAHALEKUEWA.—Male; aged 17; sick 2 years. Child of leprous father, now dead. Mother strong and apparently healthy. There are 13 children, 4 of these—older than he—have died of leprosy, but the younger have not yet shown any symptoms.

KANE.—Male; aged 57 years; sick 1½ years. Parents died when he was young. His first wife, now dead, was a leper.

LONO.—Male; aged 30; sick 3 years. His own father was a leper. Has three living children, but neither they nor other members of the family show symptoms of the disease.

KAILIANU.—Female; aged 11; sick over 1 year. She is the only child of her mother who died of leprosy.

KEAWE.—Male; aged 9 years; sick 4 years. Grandmother on mother's side was a leper on Molokai, but did not show symptoms until she was a grown girl. The other near relations are strong and healthy.

HALOE.—Male; aged 15 years; sick 1 year. Father, mother, sisters and brothers healthy. Lived and took care of a bad case of tubercular leprosy four years ago (now dead).

POHIA.—Female; aged 9½ years; sick 5 years. Father died a leper on Molokai. Leprosy had shown upon him three years before this child was born, and

immediately she was born she was taken away by a healthy couple and brought up by them. Two children were born before symptoms showed on father, one died from an accident, and the other is still alive. After the appearance of the symptoms twins (in addition to present case) were born, one died six months old, and the other one year. Mother died of consumption.

MAKAIE.—Male; aged 80 years; sick 10 years.

PAAHAO.—Female; aged 63 years; sick 1 month.

Husband and wife, and lived together for fifty years. "They, as husband and wife, have lived a very good life, for natives, keeping themselves respectable." None of their relatives have leprosy, nor have they lived with it.

KEAO.—Female; aged 45 years; sick 1 year. Admitted January 24, 1883.

Small light copper-colored tubercles on back and thighs, red discolored blotches with partial anæsthesia, also total anæsthesia of top of left foot. Became a prostitute 11 years of age and contracted a disease. Chancre, non-suppurating bubo on right groin; formerly, when small, had foul ulcers on legs and arms. Though at times apparently cured these ulcers would return at intervals of a year or two up to the present time. She married, in the interval and became pregnant, but the child only lived till it could crawl, then died. It was apparently healthy but drooped away, with fever perhaps. She is much troubled with costive stools; no appetite; her menses free, slight pains, but very dark and coagulated in clots. Parents strong. Says that none of her relations ever had leprosy. First symptoms of this trouble were cold chills towards night. Anæsthesia appeared gradually; does not increase at present. Has been treated by Dr. Fitch for five months without much change.

Died April 3, 1883, of exhaustion from syphilitic fever.

PUUPUU.—Female; admitted March 10, 1883; aged 40; sick over one year.

Sore on hands; discharged bones from fingers, same distorted; plantar ulcer on right foot, stupid and anæsthetic, hopeless. *Is wife of Kekalohi*. Transferred to Molokai.

KEKALOHI.—Male; aged 47; sick 2 years. Partial loss of eye-brows; face, flat, tubercles and swollen, red flush; fingers tapering badly; large flat tubercles rounded on edges on legs; epigastrium and back bad; arms the same. Had bubos, chancres, gonorrhœa, and stricture. Hopeless. Tubercles with partial anæsthesia. *Husband of Puupuu*. Died August, 1885.

KAUHI.—Male; admitted March 10, 1883; aged 19; sick $3\frac{1}{2}$ years.

Nearly total loss of eye-brows. Lost bones from fingers of the right hand leaving them shortened up with slight signs of the nails yet small and deformed. Anæsthesia of same reaching up nearly to the elbow. Indolent, eating, irregular ulcer on left breast acting as a vent. Feet immensely swollen and black. Ankles dry, cracked and shining. Hopeless. Father died of asthma, and mother of large ulcer on left breast. Died from exhaustion March 25, 1886.

STEPHEN KIWAA.—Male; admitted March 10, 1883; aged 23; sick over 4 years.

Contractions of the flexor tendon of both hands with enlargements of ends of fingers. Loss of bones from toes of left foot; plantar ulcers right and left. Anæsthesia on both forearms up to the elbows. Eyes watery and lower lids drawn down. Atrophy. Paralysis of left face well marked. *Grandmother a leper on father's side*. Had many bad sores on entire body when 6 years old with scabby eruptions when very small. Hopeless. Molokai.

AA.—Male; admitted March 10, 1883; aged 29; sick 16 years.

Paralysis of left face with anæsthesia. Contractions of the flexor tendons on fingers of both hands. Has

lost parts of bones from fingers, distorted, also first and second joints of first finger of right hand. Right foot swollen and large. Plantar ulcer. Blanch and pink spot like ring worm on epigastrium. Has been a sailor on whalers and visited California and other places. Died six days after transfer to Molokai.

KAAILUWALE.—Male; admitted March 10, 1886; aged 45; sick 9 years.

Disgusting sores on right hand and right foot. Paralysis of right side and face. Drooping eyelids. Hopeless. Plantar ulcer on right foot. *Thinks he obtained this illness from living with lepers.* Parents both healthy. To Molokai. Died 1885.

HANA.—Female; age 30; sick 3 years. Nearly total loss of eyebrows. Tuberculous cheeks and forehead; fingers tapering; skin loose, dry and furrowed. Lobes on ears but slightly elongated. Small tubercles on back. *This is the first case not preceded by chills, etc.* She injured her thumb under the nail by pricking it with a needle and became very sore and shortly afterwards her eyebrows began to fall and tubercles appear. She probably, from her description, inherited syphilis from her father. To Molokai.

KAKE.—Female; admitted November 13, 1883; aged 46; sick 8 years.

Scar on nose from former ulcer with sunken corner; nearly total blindness, cheeks swollen and tuberculous with partial anæsthesia of the same. Fingers tapering. Tubercles and anæsthesia on the thighs and back prominent and partial on the epigastrium and breast, arms and wrists. Hopeless but not bad. To Molokai.

KAHANAAUPUNI.—Female. Her only living child out of a family of nine. Admitted March 13, 1883; aged 23 years; sick 9 years.

She showed signs of the disease about two years before they appeared on the mother. Same general diagnosis as mother. Thickness, tubercular form in skin of face with anæsthesia, fingers tapering. The mother first showed red flush and thickening, while this child had

blanched cheeks first which afterwards developed into flush, then tubercles. Anæsthesia on arm with slight discoloration and rough. Hopeful. Small tubercles, syphilitic ears, watery eyes, etc. To Molokai.

MIELE.—Female; admitted March 9, 1883; aged 46; sick 7 years.

Paralysis, drooping eyelids with atrophy, eyes watery; a former severe ulcer on left wrist, treated at Queen's Hospital, now well, but has the left hand anæsthetic and fingers distorted; flexor tendons contracted to palm of hand; immense scars on knees; glossy knees and legs, ditto on feet, very dark. *Leprosy and venereal run in the family. Two of her own children are now lepers on Molokai.* Tongue badly cracked and fissured. Hopeless. Died 1886.

REBECCA.—Female,—her grandchild. Admitted March 9, 1883; aged 12; sick 6 years; is *the child of a leprous mother*. Apparently healthy until 6 years old. Had sores on the private parts, and nose suppurated. Bubos came and went. Had small-pox which caused loss of joint of fingers and pieces of bones of others, leaving the distorted, enlarged white-pink scars. At the present time there is a total loss of eyebrows, loss of soft palate; cannot speak loud; tubercles on lobes of ears and cheeks; end of nose sore; numerous scars on legs and knees; the skin of the leg is dark, dry, shining and cracked; tongue cracked. *Is the only child of her mother a long time after she had the leprosy.* Grandmother also leprous. Died 1886.

NIULI.—Male; admitted March 9, 1883; aged 7; sick 1 year.

Contraction of the flexor tendon on left forearm. First joint of the thumb of the left hand enlarged. Skin of the forearm dark and rough, also on the entire body rough and covered with small spots like pins' heads, flat and glossy. The sites of former syphilides on post r. and l. prominent. Skin of legs, ankles and feet very dark, rough and scaly, more like a scurf. Right heel swollen, and ulcer, sunken and active on

inner side of the same below the ankle. Scar on the left side of the neck, irregular, long, a former deep ulcer; is brother of Kaiakea, and inherited syphilis from both parents. *Leprosy also seems to run in the family.*

KAIAKEA.—(Brother of the last case); admitted March 9, 1883; aged 11 years; 3 years sick.

Nearly total loss of eyebrows. Entire face tuberculous—more of a flush—still the thickness is very apparent. Fingers very tapering and tuberculous; very stupid, sunken verner, a rough looking eruption of skin on back like that seen in syphilitic ring worm, but this is more of a blotch of the entire back. The skin of the back and front of legs is dry, dark and furrowed. *An older brother was a leper on Molokai with contraction of flexor tendons, but became so well otherwise that he was discharged.* Father and mother were both very badly syphilitic. March 31, 1883, transferred to Molokai. Died April 11, 1886. "A very advanced case of tubercular leprosy and died of dysentery."

PUAHILANI.—Admitted March 9, 1883; age 54; sick 12 years.

Total loss of eyebrows. Has lost every toe, but the stumps have healed up at present. Loss of first joints of fingers on first, second and fourth on both hands and parts of bones from sides of others now healed with white scars. Face completely anæsthetic and greater portion of body. Skin of legs and form very black and dry, and epidermis furrowed. Tongue badly fissured. *His wife was a leper and died on Molokai 13 years ago.* Sent to Molokai March 31, 1883.

PANIKI.—Male; admitted February 19, 1883.

Anæsthesia, paralysis, atrophy of lower eyelids, left more affected; lost portion of bones from left thumb. Treat while here with Hyd. Bichlor. He says his trouble was caused by swearing an oath with his sweetheart of eternal constancy which she violated and *the Gods were angry.* She died but he escaped with a crooked mouth.

HOOMANANANUI.—Female; admitted March 9, 1883; aged 14; sick 4 years.

Total loss of eyebrows; lobes of ears enlarged and small tubercular syphilides; fingers tapering and partial contracted flexor tendons of ditto. Left post cervical enlarged like a pea elongated; long patch æsthesia on outer side of both forearms, skin dark and partially thickened; skin of leg dark, shining, etc., anæsthesia on top of left foot; large scars on knees. Has non-suppurative buboes frequently on left groin. Probably inherited them from her mother from her description, *but has resided with lepers.*

KIKILIA. Female; admitted March 10, 1883; aged 34 years; sick 6 months.

Tuberculous cheeks, partial loss of eyebrows; lobe of left ear slightly affected, elongated. Partial paralysis of left side of face, sunken corner. "Her own mother has been to Molokoi as a leper." Tubercular face. Thinks she, however, did not show leprosy until after she was born. Circular ulcers on right leg below right knee, raised, greenish, rough, denoting second syphilis. Very hopeful case.

KALUNA.—Male; aged 10 years; sick 1 year; mixed, bad.

August 15, 1882, his own mother was here; obtained the following history from her: Kaluna was born May 23, 1871. The mother is a rather large sized, well made woman; her tongue is fissured, broad and tooth-marked. Epitrochlear gland left arm marked, right cannot be found nor the post cervical glands. She has had five children, Kaluna was the third child; all are living; this one only shows leprosy. When he was two years old he was adopted by a sister of the husband where he lived until he was seven year old when he became covered with sores on privates and fundiment. Returned to mother who cured him by letting her spittle stand for some time on a piece of brass metal, then applying it to the sores. It caused a cessation of the pains and ultimately cured the disease

after she had tried many medicines. One year afterwards when a blotch (faded light) showed on right thigh and showed gradually on entire body during the next year when the cheeks became red, with no itching. After a few months tubercles began to form, slight at first and have increased since last January to their present stage. He was a very healthy child when young, skin fair, etc. The mother's mother soon after giving birth to the mother had a gripping pain in the breast which caused her to grow very poor and die from it when Kaluna's mother was young. The father of the mother lived to be quite old and was robust and healthy, dying a natural death. "Kaluna's father is a leper now on Molokai." His name is Kupele. He was taken last October, 1881, with the same form of leprosy. Soon after his marriage with Kaluna's mother he was much troubled with cold chills and great heat of the entire body for six months. This was before the birth of any of their children. This case continued until the first child was born, who died after the first month, when the father had cessation of chills for about a year when he had another spell which again left him after some months, but he had violent pains in the body and joints when the second child was born, a boy,—then a year afterwards, a girl, then this boy Kaluna, after which chills again came, more violent than before. He tried native medicines which proved beneficial for a time. When the child was three years old the father was taken insane for some months, violently so. Cured by kahunas. A year later he was sitting by the side of an open fire, not very close, without any covering for his legs when the heat caused large blisters to show on his right leg and ankle which ran into ulcers which they called leprosy. (It may have been anæsthetic before so that he did not feel the heat.) These ulcers, however, got well, but not readily. A few months afterwards small tubercles showed in skin of face below the eyes on the cheek bone, but these did not spread rapidly. He tried all the native remedies but they were no use.

Had a bad attack of dysentery which almost killed him but was cured by kahunas. Flush spread to face and gradually increased. For some months he tried many native doctors until all the money, pigs, chickens, awa, etc., was all gone, yet he got no better. He would get better, but exposure to sun, wind and water would bring it out again worse than ever; gradually increased became swollen, ran into sores, offensive discharge of pus. Native medicines improved that but the skin of the feet became very sensitive. Weak in legs, slightly swollen. Had no contraction of joints, but limbs and hands seemed wasted away. Kaluna, the son, was sent to Molokai August 21, 1882.

KAAIHOLEI.—Male; aged 10; sick 2 years; admitted January 30, 1882. Died October 30, 1882.

Chin one large tubercle, right and left cheek the same, the forehead slight ditto; ear enlarged three times the natural size with lobes one large tubercle four times the natural size; hands tubercular and swollen. Anæsthesia from elbow, fingers greatly enlarged and weli marked taper. Front part of neck discolored, dark with ragged edges well defined; entire chest slightly the same. Eyes red and bloodshot, eyebrows partially disappeared. Scars one and a half inches in diameter on right and left elbow from former sores; circular patch morphea one inch on left shoulder blade, muscles of thighs and legs enlarged, feet and malleoli anæsthetic and swollen over twice the natural size, with the ankle not swollen but anæsthetic. Immense scars on knees and front of legs from former running sores; three sores on left leg partially scabbed over at present. Tongue thick, tooth-marked and fissured; slight sores in corner of mouth. Entire body and face resemble the ancient portraits of the "Satyrs." Weight 71 pounds. "Mother has leprosy," and is on Molokai. No neuralgia. Treatment Hospital mixture, No. 1 Ung. Hydrarg. Ammon. to face. Feb. 18th.—No change. March 9th.—Continue No. 1 Ung. Hydrarg. Ammon. General health better, no change to leprosy.

March 26. Continue treatment. Tubercles on cheeks greatly decreased in size and softer; on chin also slightly. No change of anæsthesia. General health not so strong.

April 20. Continue treatment. Great improvement as to tubercles of face. Chin about one-half of former former size and very soft. General health quite weak. Syr. Iod. Ferri. Small sore size of a quarter dollar, with a fungus like protruding core, opened on sole of left foot near big toe, quite painful; foot not badly swollen. Acid. Carb. dil: and Ung. Hydrarg. dil.

May 8. Continue treatment. Sore on foot increased, is quite weak and languid. Ammon. Carb. Face improving wonderfully; hand about the same; anæsthesia on legs and feet the same. Sore on foot bleeds easily from around the core, blood black and thick. Appetite fair, complains of dizziness but no pains.

May 25. Continue treatment. Sore on foot improving slightly, core not protruding. Lobes of ears near natural size and wrinkled where the former tubercles were. The same on chin, nearly level with the skin. That heavy dull look gone. Quite lively but weak.

June 14. Bubo has appeared on left groin. Came to the size of a hen's egg, burst and discharging; swelling relieved by discharges, pain from the same slight. General health good but weak. Sol. Syr. Iod. Ferri.

June 19. Swelling slight on bubo, the same healing, pain slight. Sore on foot tubercular and protruding; no discharge but does not heal. Chin has resumed its natural shape. Lobes of ears shrivelled. General health good but delicate. Continue Syr. Iod. Ferri.

July 9. Enjoys passably good general health, but not strong. Slight pains in right side. General pale look to face. Food seems to do him no good. Tinc. Clor. Ferri after meals.

July 13. Pains in side less. Is having a swelling of glands or bubo on left groin. Paint some with Morph. Sulp. and Tinc. Iod. comp.

July 15. Slight improvement. Pains in groins less;

Rested fair last night. "His own father, Naoho, is here." He is a thin man, 53 years old, well preserved for age, tongue thick, fissured in center, badly tooth-marked and fine red dots around edges, epitrochlear of left arm slightly enlarged; was married to present wife 29 years ago. Has had eight children; two, the third and fourth are dead, the first and last are alive. The patient, Kaaiholii is the seventh child. The father has had bubos on the right groin, did not burst, also gonorrhœa and stricture. Is not certain about chancre. Is much troubled with asthma which is most troublesome at evening. No appetite; stools as a rule are costive. Nocturnal neuralgia of joints. These symptoms were all prominent before the birth of this patient, who has developed what is known here as leprosy. The child was in perfect health until three years of age, when he was riding a horse with his brother, was thrown off and received injuries which run into small sores and became partially paralyzed, and leprosy showed but did not spread to any great extent until two years ago from exposure to cold, rain and sea bathing of which he which he was very fond and the symptoms increased very rapidly.

Grandfather on father's side was a tall, slim man. Did not appear to the children to be sick; died from accident. Grandmother was short, thick set in body. She was troubled with asthma until death. She had ten children. Eight—the first and last children are dead—two being born nearly the middle of the line of births are now alive, both troubled with asthma, pains in chest and myalgia of joints.

July 27. Mother of patient was here. Her name is Maleka. She is 40 years old and has been married over 20 years. Is rather tall, thin, high cheek bones, skin yellowish or sallow-looking, nose pitted, eyes dull, fingers long but nos tapering; tongue broad, cross-fissured and plainly tooth-marked; post cervical (posterior chain) left side enlarged. Epitrochlear on both arms, right more than left; has had buboes on right groin

burst before giving birth to children ; has had a vaginal discharge with burning (gonorrhœa perhaps), was cured by a foreign doctor. Is troubled with a sort of asthma which began soon after giving birth to first child. Great intermittent pains in joints, knees, small of back, worse at night. Has always been very costive with no appetite whatever. Sometimes troubled with nausea. Her father was a very tall man ; died of old age. Mother was short, fat and strong. She also died of old age. Thinks they never were sick, as father was a "big kahuna" (doctor and sorcerer). Kaaholii's brother, Poomaikai, younger and last born, age 8 years, has contractions of flexor tendons of fingers of left hand and enlargement of first joint of first finger bad, with absorbing nail. Post cervical (posterior chain) left side, much enlarged like a pea elongated. Tongue tooth-marked and broad. Has had scaly eruptions of head a few years ago. Has white faded spots scattered generally over body but no anæsthesia. General health good.

The mother of Kaaholii was one of seven children, the only one living. The rest all died young. She was the second born. The males died of asthma and general debility, the females came to Honolulu and became prostitutes and died from the effects of the life.

July 27. Discharge from groin smaller and swelling less ; controlling pain with Sol. Magn. Very weak, but still eats. Give Ammon. Carb. as required, Continue Tinc. Chlor. Ferri after meals. Is growing very thin and slowly wasting away.

Aug. 18. Again improving slightly and gaining strength. Appetite good and sores on left groin slowly healing and discharge becoming less under Ung. Hydrarg. Dil. Continue Syr. Chlor. Ferri after meals and Sol. Magn as required.

Sept. 23. Keeps just about the same. Sore on right elbow will not scab over, looks like piece of raw ham in color. The same on groin and epigastrium, more healing. Good appetite, but the food seems to do him

no good. Is little more than skin and bone. Lips and eyes good color, the latter bright and glistening; cannot walk of himself, but can crawl like an infant on his hands and knees. Treatment, Acid, Nit. mv. before meals, and Tinc. Chlor. Ferri after.

Oct. 5. Testicles much swollen. Skin tight and glazed. Foreskin of penis also much swollen. Ulcer on thigh still keeps open with considerable discharge, while that on elbow of right arm is drying up. Is growing much stronger. Dr. Rodgers opened skin in several places by cutting epidermis with scissors, a watery and bloody discharge oozes slowly from the incisions.

Oct. 9. Openings in testicles, also increase in pain and swelling. Dr. Fitch again opened skin in five places, slightly relieved; ulcers will not close, deep, ragged edges, uneven flow on thigh, very offensive. Has gained a little strength. Good appetite. Apply Sol. Argent. Nit. on swollen testicles.

Oct. 11. Swelling of scrotum less. No discharge from the punctures in skin of same. Signs of approaching gangrene in same. Apply cloths with Dil. Acid. Carbol. on same. Complains of pains in left side and back. Give enough Sol. Magn. to keep easy.

Oct. 14. Slight gain. No change to ulcers, but swelling less. Signs of approaching gangrene less. Has good appetite. Sol. Magn. keeps him easy but he cannot last long.

Oct. 21. The end is coming fast, circulation of blood becoming feeble; pale look to his face. Stop Acid. Nit., use Sol. Magn. to ease him. Still quite strong; can sit up and eat his food with relish. Syr. Iod. Pot. with Carb. Ammon.

Oct. 22. Much the same. Continue treatment a little weaker. Stench from ulcers intense. Removed him from ward to morgue.

Oct 23. Continue treatment. Slowly growing more pallid, and weaker but eats well and talks more cheerfully.

Oct. 24, 9 A. M. Epigastrium much bloated and

swollen, with oppressed feeling. Still cheerful, poor boy, and asks for a cathartic, says he has been eating too much! Stop Iod. Pot. and give him castor oil.

Oct. 25. Cathartic has worked; slightly easier; puffy swelling extends to the thighs. Keep easy with Sol. Magn. Still relishes food, milk, crackers, etc.

Oct. 26. Slight change. Weaker. Give spirits of turpentine every four hours. Passes considerable putrid wind from epigastrium. Swelling slightly less, breathing becoming labored.

Oct. 27. Continue treatment. The candle is burning slowly out. Still perfectly conscious. No stools since yesterday; passes wind frequently and urinates freely, yellow, reddish, thick urine. Pulse slow and feeble. Too offensive to make many observations as to what, etc.

Oct. 28. Still lives and this is about all; converses rationally, breathing labored. Takes a little milk; keep him quiet with Sol. Magn. No action of epigastrium. Itching of skin on breast and shoulders. More inclined to sleep from which he wakes up every few moments with a start.

Oct. 29. Last evening after the usual dose of Sol. Magn. to keep him easy, he turned on his right side; something he has not done for four months, and slept easy, when about 2 o'clock this morning he awoke, slightly delirious, with his mind wandering, talked of home and horse riding. Respiration spasmodic. Died easy between one of these spasms between 3 and 3:30 A. M.

KALUAHINE.—Female; aged 60 years; 10 years sick; admitted February 8, 1882; died April 10, 1883.

Partial absence of eyebrows. Right and left cheeks tubercular below the eyes; forehead the same. Anæsthetic, right and left forearms and hands, right and left legs and feet from the knees down; skin discolored, dark in small tubercular blotches, not raised but plainly on breast and epigastrium regions, intermixed with small circular light specks size of a small pea, like

morphæa alba, but not connected. Myalgia and osteocopic pains severe, tongue broad, deeply fissured and tooth-marked. No appetite, restless at night. Stools very irregular and watery without griping. Lobe of left ear thickened slightly. Contraction flexor tendons of second, third and fourth fingers of the right hand; second slightly and increasing on third; nearly touching palm of the hand with fourth finger. Had bubos bad after being married, then after giving birth to a child had pox. Had running eruptions of the skin when young until 14 or 16 years old, was often troubled with griping pains when young, for a week or so at a time. "None of the family, or progenitors, have had leprosy, nor has she resided with it." Commenced by cold chills of the extremities and myalgia, caused by exposure. Her family being great fishermen she would go with them in the water, gathering moss, etc., from morning until night. Treatment Hospital mixture No. 1.

Feb. 26. Continue treatment; stools becoming more natural; appetite increasing. Can rest better at night. General health improving. Pains of legs and feet quite severe.

March 20. Continue No. 1. Pains in legs rather more violent. No change to hand or face. Increase Iod. Pot.

April 16. Pain legs improving. General health better. Considerable appetite. Rests very well at night. Anæsthesia slightly improved.

May 2. Continue treatment. Improving slowly. Tubercular formation on face decreasing in size, still prominent. General health very good.

May 31. Continue No. 1; add Iod. Pot. Anæsthesia of forearms and legs decidedly improved. Sensation in those places nearly as perfect as in other parts of body. Has a healthy look to face. Very slightly tubercular and eyes and lobe of left ear. Stools regular and healthy. Rests well at night. No myalgia or pains in body or joints. Hand about the same. Is in

in good health for an old woman, having been born during the reign of Kamehameha I. Gaining in flesh, weight 120 pounds.

July 22. Has been growing worse these few days. On investigation find she has not taken the medicines. Tubercles on third joints of the fingers worse and hot burning sensation. Paint with Sol. Argent. Nit. and increase Iod. Pot. General health passable.

July 31. Increase again; swelling improving.

August 15. General health, and puffy swelling on hands and face improved. Increase Iod. Pot. again.

Sept. 10. Continue treatment. Going down hill again. Nodes appearing on legs. Paint with Tinc. Iod. Comp. Complains of pains in bones; weak, no appetite. Remove to bad ward. Give Colombo and Amm. Carb.; also No. 15 as required.

April 2, 1883. Has kept on failing slowly. No hope till present time. Commences to have bloody stools. Very weak. Give Sulp. Morp. and Brom. Pot. as needed.

April 10, 7:30 P. M. Has been unconscious since 2 o'clock this afternoon; now ceased breathing. Will have post mortem in the morning.

Post Mortem, by Dr. G. L. Fitch.—Body well nourished; fat more than inch thick over abdominal wall. Thoracic cavity, right lung adherent over entire upper half, left lung slightly adherent at upper portion. Both lungs soft. Small crepitant. No disease apparent. Amount of serum in pericardial cavity; heart, normal in size but extremely fat; looked almost like a ball of butter; walls very thin and on section look as if composed of pure fat; only inner layer showing any muscular structure to the naked eye. Abdominal cavity, stomach and bowels normal. Liver enlarged and yellow; looks as if it were fatty. Spleen very small, but containing menstrual coagula. Mesentery thick and fat throughout. Twenty four hours after death.

MOKUNUI.—Female; admitted December 26, 1882. Died July 3, 1883; aged 50 years; sick $1\frac{1}{2}$ years.

Partial loss of eyebrows on outer ends. Thick heavy tubercles, flat in the form of wrinkles on forehead, nostrils enlarged and tubercular giving nose a flattened appearance; breathing impeded, tongue clean, broad, pale, deeply fissured near tip. Post cervical (posterior chain) on right side enlarged; three glands distinguished like a chain, the one above the other, like elongated duck shot; the middle one most enlarged; epitrochlear not found; skin on forearm dry, loose epidermis well furrowed, having a white scurf in the furrows, withered or shrunken look to the same. Two ulcers, one on each side over inner portion of clavicle, below chin; the one on left side, protruding, size of a pigeon's egg, like the forming of an ulcer of the cellular tissue; that on right side has burst, since she has been under treatment by Dr. Fitch on Iod. Pot., emitting an intensely offensive discharge. It has gradually healed showing a drawn puckering scab like a star with its points. The one on the left side has shown but lately since the other began to heal. Body and legs remarkably free from scars for a native but has a dry parched look; feet same general look as forearms. Was married when about 30 years old. Had lived a very loose life up to that time after a native fashion. She formerly had a well rounded body, but after a four years' obstinate sickness of bloody dysentery became much shrunken. When she recovered from this she was seized with cold chills in the lower extremities, a continuous cold as if in the bones. This was worse towards night. After a month of these chills tubercular thickening showed on the face. No history of venereal disease, but she says she had many scaly eruptions on head and body when about seven years old. Appetite slight. Restless at night. Treatment, Iod. Pot. and Ammon. Carb., and Ung. Hydrarg. Ammon. Died, July 3, 1883.

Post Mortem by Dr. G. L. Fitch:

Body somewhat emaciated. Fat one-quarter of an inch thick over abdomen. Vessels of entire intestinal

canal filled full of dark fluid blood. Gut itself congested. An opening showed marked congestion of mucous membrane in both large and small bowels. Blood vessels of mesentery as large as crow quills and distended with both fluid and gaseous contents. Contained about one quart of glairy fluid. Walls most marked by congestion; looks as if blood were ready to burst out of the red punctuated points which dot its entire surface, but are most marked towards pyloric orifice. Bowels contain much green unhealthy fecal matter. Lower lobe of liver has a marked granular aspect. Kidneys normal except somewhat congested. Spleen normal. Ovaries only left T. C. Both lungs very adherent over anterior aspects, right most marked. Heart has considerable fat about it, and is enlarged apparently. Organs of chest distended with fluid blood more than usual. Cause of death, gastro-enteritis.

RECORD OF CASES AT MOLOKAI.

Dr. Mouritz furnishes the following notes in regard to several of the before mentioned cases.

LOHIAU.—Male; aged 50 years.

A case of anæsthetic leprosy, affecting the left hand only, producing the usual deformity caused by this form of leprosy, viz.: atrophy and palsy of the interosseous muscles, gangrene of the distal phalanges and subsequent separation of necrosed parts, leaving stumps at times actively ulcerating, at times healed and sound.

This man is a fine powerful Hawaiian; had no illness of any serious nature, but slight attacks of bronchitis and diarrhœa, from which quickly recovered, neither of these serious enough to confine him to the house. His mutilated hand during the past 12 months was soundly

healed, and the disease (leprosy) showed no outward signs of activity. This was his condition when he was removed from the settlement in November, 1885, and as often as I had noticed him, when he applied to me for the relief of various trivial ailments. I was led to conclude that the disease in him was latent, and was likely to remain so for some years to come.

HEANU.—Female; aged 30 years; single; from Hilo.

A case of tubercular leprosy; advanced. During the past 18 months I have treated her for bronchitis, and general eczema. She recovered from the former, and the skin trouble is nearly cured.

Present condition: Makes no complaint of any kind, eats and sleeps well.

Eyebrows entirely extruded, lobes of ears very slightly enlarged with tubercles. Face, forehead and cheeks present evidences of tubercles, and general infiltration of leprous matter. Although this case is advanced there has been no suppuration of the tubercles or in any part of the body. The most ominous sign is the "muddy pallor of the face," which I now interpret as the forerunner of diarrhœa (and rapid exhaustion) and leprous fever, which will probably be fatal.

KAHANAAUPUNI.—Female; aged 26 years; single; from Hilo. A case of mixed leprosy. I have treated her for fever of the usual recurrent type peculiar to leprosy. Bubo in the right groin, plantar ulcer over the bases of the fourth and fifth metatarsal bones of the right foot.

Present condition: Now enjoys good health; devoid of pain, eats and sleeps well. Eyebrows slightly diminished; ears unaffected; slight infiltration of cheeks, but not causing any disfigurement, with the sole exception of the ulcer on the plantar surface of right foot, (which is now active). This woman has no suppurating surface on the body, and the disease in her made, and is making very slow progress.

KAKE.—Female; aged 46 years; mother of the preceding woman (Kahanaaupuni); from Hilo; an advanced case of tubercular leprosy.

I have treated her for bronchitis, diarrhoea, ozena, glossitis, gengivitis, thrombosis of the femoral vein. She has now kept free from any fresh trouble for four months, and has left off all medical treatment for the present.

Present condition: Face, cheeks and forehead, infiltrated, and covered with leprous tubercles (size of a hen's egg), none suppurating; eyebrows gone; ears moderately enlarged; no sores on body. Her nose is much enlarged, the alæ bulging out, and her chief trouble is ozena due to the presence of dead bone in the nasal fossa.

KEAKA PAAKAULA.—Male; aged 30 years; from Hilo. Transferred March 31, 1883. A case of tubercular leprosy. Enjoys good health, and has had no illness since his residence here.

Present condition: Advanced. Eyebrows gone; face, cheek and forehead, shows the remains of past tubercles, now destroyed by ulceration, but leaving seams and cicatrices on the skin. The alæ of nose are covered with a mass of conglomerated ulcerating tubercles; ears are lobed excessively. The fingers are enlarged, fissured and present raw surfaces. Plantar ulcers are present on both feet.

PAPOMAIKAI.—Male; aged 31 years; from Waihee. Case of mixed leprosy. Has had good health here since he was transferred March 31, 1883. I have treated him successfully for a large callous ulcer on the outer surface of right leg extending from the ankle to near the apex of the tibia.

Present condition: Voice hoarse and stridulous; nasal bones sunken; ears normal; eyebrows much thinned; alæ of nose destroyed; fingers of both hands, the terminal phalanges are destroyed, the stumps being strongly flexed on the palm. At the base of the metatarsal bone of right foot is a large ulcer.

PUUPUU.—Female; aged 48 years; from Waihee; transferred with her husband (now dead) March 31,

1883. A case of anæsthetic leprosy. Is in good health, and has had no illness all her life except leprosy, which causes her no inconvenience.

Present condition: Face and body clean and healthy. Finger mutilated on both hands, and plantar ulcers on both feet, varying in site, at times healed, at times open, but of small size, and causing her no discomfort.

KAPIIOHO.—Male; aged 43 years; from Wailuku; transferred from Kakaako, March 31, 1883. A case of mixed leprosy moderately advanced. Has enjoyed good health, and has had no complications of leprosy requiring treatment except ulcers of the feet.

Present condition: Eyebrows destroyed; ears normal; cheeks and forehead infiltrated with leprous matter; no tubercles. The toes of both feet are mutilated, some entirely destroyed. The interossei muscles of hands are atrophied but not paralyzed.

KAILI.—Male; 16 years of age; from Kau. A case of mixed leprosy. Has not had any treatment.

His present condition: Feels well, no pain, takes his food; case is moderately advanced. The face is generally infiltrated, no tubercles; the right hand is mutilated, many of the phalanges of the second, third and fourth fingers being destroyed and the stumps strongly flexed on the palm, the other fingers are covered with suppurating ulcers, some deep, some superficial. Both feet are affected with plantar ulcers.

KALUNA.—Male; aged 14 years; from Haiku; transferred August 21, 1882. A case of tubercular leprosy, advanced. Since he has resided here he has had no illness to confine him to the house; has had no treatment from me.

Present condition: Eyebrows lost; ears much enlarged and disfigured with tubercles, and this is also the condition of his cheeks and forehead, which latter show traces of past extensive ulceration, being corrugated, warty and seamed. The chin is now the seat of extensive leprous infiltration, as yet devoid of ulceration.

The nasal bones are destroyed, and the cartilages of the alæ.

STEPHEN KIWAA.—Male; aged 27 years; from Ulapakua; a case of mixed leprosy, but he has not had any medical treatment. He states he is quite free from pain, his appetite is good and were it not for his feet he would be quite as well as ever he was.

Present condition: Left eye destroyed, the right is much affected with pterygium. Tubercles are present on face and cheeks, not on forehead; ears present slight traces, the lobes being more pendulous than natural; both hands present past traces of the ravages of leprosy; the fingers are shortened, distorted and almost useless; both feet are affected with ulcers, the right has the peculiar excavating ulcer in the heel, almost diagnostic of leprosy; the left foot, the ulcers are situated over the bases of the metatarsal bones, some over the heads of the first phalanges.

KALIKO.—Female; aged 36 years; from Makawao. (Has a daughter here, Kekai, 17 years old, almost her facsimile in disease). A case of anæsthetic leprosy. Has not made any complaint of illness and says on interrogation she has no special ache or inconvenience. Both hands are much mutilated by past ravages of the disease, but no wounds are present, the stumps being soundly healed. One ulcer is situated on the plantar surface of heel.

PUAHILANI.—Male; aged 57 years; from Ukamehame; a case of mixed leprosy. I have treated him for bronchitis and aching osteal pains; he is now free from both these troubles, and gets about quite comfortably.

Present condition: Eyebrows gone; ears present traces of old ulceration; the bridge of nose is sunken, and the alæ are also destroyed; voice hoarse and stridulous; feet and hands much affected with the disease, the fingers and toes having almost totally disappeared, leaving the stumps of metacarpal and metatarsal bones respectively.

ACT OF 1870, CHAPTER XVI, RELATING TO DIVORCE.

SECTION 1. Divorces from the bond of matrimony shall be granted for the causes hereinafter set forth, and no other.

First. * * * "And when it is shown to the satisfaction of the Court that either party has contracted the disease known as Chinese leprosy, and is incapable of cure."

RULES OF THE BRANCH HOSPITAL, KAKAAKO.

1. The Hospital is under the general superintendence of the Mother Superior of the Order of Franciscan Sisters.

2. No visitors except Their Majesties, the King and Queen, His Majesty's Ministers, Members of the Board of Health, and the Physicians of the Hospital, will be permitted to visit patients without a written permission from the President of the Board of Health.

3. Friends of patients not confined to their rooms will be allowed to visit them at the gate house every day, between the hours of 8 A. M. and 6 P. M.

4. All lights must be extinguished in the Hospital premises at 9 P. M., unless otherwise ordered on account of sickness.

5. No articles of food as gifts to patients, from friends outside will be allowed except by permission of the Superintendent.

6. It is forbidden to introduce into the Hospital premises articles of food or drinkables of any kind for sale.

7. All food for patients must be cooked at the Hospital kitchen, by the appointed cook.

8. Articles of food must not be carried from the refectory to the sleeping rooms.

9. All patients must go to the refectory for their meals, unless excused on account of ill health.

10. All games of chance for money are strictly forbidden within the Hospital premises.

11. Patients must not indulge in profane, or indecent language or songs.

12. It is strictly forbidden to patients, for men to visit the women's departments, and women that of men.

A strict accountability will be held for any violation of the above rules.

By order of the Board of Health.

WALTER M. GIBSON,

President of the Board of Health.

APPROPRIATION FOR LEPERS.

[Editorial P. C. Advertiser, July 13. 1878]

The popular sentiment among Hawaiians been somewhat averse to the segregation of their afflicted countrymen at Kalawao, Molokai. At the commencement of the present session of the Legislature it was feared by some in the foreign community that a majority of the native members would vote against any supplies for the support of the leper settlement; but we are gratified to record that the former liberal appropriation has been exceeded by an addition of ten thousand dollars, and moreover, native members readily voted another ten thousand dollars in order to secure the services of a first-class superintendent for the settlement, who should be a physician of repute, during the next bi-ennial period. The chief opposition to this especial appropriation came from a foreigner. After such evidence of liberal provision for the sick of Hawaii, in accordance with the most enlightened treatment and management, we trust that the voices of the sneerers at Hawaiians,—who say that they are without thought or reason in the consideration of a great evil, and would be willing to ruin or injure the nation by a return of the lepers to their homes,—will now be silenced. As remarked by the Hon. Mr. Gibson, this liberal provision of the Legislature, so largely composed of native Hawaiians, redounds to the honour of this country. And as we believe in giving honour to whom it is rightly due, we have no hesitation in saying what we know to be a fact, that it is largely due to the influence exercised upon the native members by Mr. Gibson that this liberal appropriation was carried. The following is an abstract of the remarks of that gentleman in proposing an increased appropriation for the leper settlement:

“MR. PRESIDENT:—The provision made by the Assembly of 1876 for our unfortunate lepers was large and redounds to the honor of this country, considering the smallness of our country and our resources.

But I propose that we should do still more. Enough is provided for food, clothing and lodging, if properly administered; but there are certain things essential to the comfort of the sick, for which some additional means should be voted. The leper has no light in his hut, unless he is enabled to buy oil with his own means. Many have no means to buy, and must pass weary hours in darkness. It would be a heavy item of expense to supply every one of a community of 700 with a ration of oil—say one quart a week, but if this quantity be supplied to a group of seven, or say to each house or hut per week, we need not add more than \$1,200 to the appropriation for this item. Next comes soap, which would be a very heavy item if fully supplied; but we ought to provide for at least one bar of soap per month for each leper, which will be but a scant supply for cleanliness, and this addition will require \$2,000 more. The beef rations of 6 pounds a week is considered too small, but I think if the poor leper gets his full ration of 21 pounds of taro he will not suffer with 6 pounds of beef. However, we might add 1 pound of beef which at 4 cents a pound, the lowest estimate, would require us to vote \$3,000 more. Now, if we provide for salt, some utensils, and an increased supply of medicines, lint and disinfectants, we may probably add enough to require a full \$10,000 more to be added to the appropriation as called for in the bill. We must vote for this, if we have to let other things stand still. How can we vote for any measures for public improvements and neglect our unhappy lepers? Their last cry to me and to the members of the Special Committee as we passed from them at Kalaupapa was. Do not forget us! And we will not and cannot forget them."

The proposed increase making the amount \$6,500 was promptly voted by the Assembly. The honorable member then proposed an additional item of \$10,000 to provide for the pay of a superintendent at Kalawao. He said:

"He wanted to provide for the services of a man very difficult perhaps to find. The man needed now at Kalawao should have first-rate executive ability and be a physician of repute. He should moreover be a man of great heart, an enthusiast in the cause of humanity, and one anxious to win a noble name as a benefactor of suffering humanity. Many say it is hopeless to find such a man; but let us provide liberally,—let us put the means into the hands of the Government. Let us acquit our hearts in this matter, and it may be that a brave, generous and enlightened soul shall come forward from among the many self-sacrificing worthies that this world produces from time to time, and we shall find the man that our great calamity calls for. He should be chief of a medical staff that had full charge of the lepers of the Kingdom. Such a man is the crying need of the leper settlement at Kalawao. The lepers all said, Send us a physi-

cian, we live now without hope ; a physician would give us some hope. And even if we believed all their cases incurable, shall we deny them the consolation which all crave, when suffering, to listen to words from skilled lips that revive our hope of life?"

After slight opposition this item was voted by a large majority.

[Extracts from the writings of Walter M. Gibson, published in the "Nuhou," Honolulu, H. I., 1873-1874.]

THE LEPERS AND THEIR HOME ON MOLOKAI.

Leprosy is a word of dread. Some men would slay themselves rather than live lepers. It has always been the fearful scourge of Asia, and of the brown races more than of the white. It has become the terror of this Archipelago, but is not yet known in other groups of the Pacific. How it came here we cannot tell, although it is called by natives the *Mai Pake*, or Chinese disease. But everything the natives don't know anything about, they designate as of Chinese origin. (Lettuce is called by the natives, *Kakipi Pake*, Chinese cabbage).

It is spreading rapidly. There are 438 confirmed lepers in Kalaupapa, and nearly as many more throughout the Islands with manifest symptoms of the disease. The chief cause of its increase lies in the native apathy. The healthy associate carelessly with the bloated, hook-fingered victims. The most awful conditions of the disease neither scare nor disgust, and the glistening, distorted face is rubbed against as complacently as the most healthy countenance. The horror of this living death has no terror for Hawaiians, and therefore they have need more than any other people of a coercive segregation of those having contagious diseases.

Some people consider this enforced isolation as a violence to personal rights. It is so, no doubt, but a vio-

lence in behalf of human welfare. It is a violence to remove a small-pox patient to a pest house, and we would not have such an one restored to friends till well. And so with the leper, he will be restored if cured. But if he continually carries with him the seeds of death, he must not be allowed to destroy his brothers and sisters. He must be kept apart from his fellows. It is done in enlightened Europe as well as in Asia; and no where is the sad necessity enforced more humanely than in the Hawaiian Islands. * * * *March 14, 1873.*

GONE TO VISIT THE LEPERS.


Mr. S. G. Wilder and Mr. Moanauli went to Molo-kai per *Kilauea* yesterday afternoon, to visit the leper settlement at Kalaupapa. The large number of people, mostly males, now residing in the settlement, will need much attention and some special organization. If it was an assemblage of Americans or Europeans in such a horrible hopeless condition, they would need strict confinement and some military force to prevent their doing acts of frenzy. Alas, we dare not think what we might be or do, if we were a confirmed leper, sure to rot daily unto death. And these Hawaiian lepers though so docile and law-abiding like all their race, may break out in their agony and despair some day, if not well cared for. They will need much attention and it will have a salutary effect upon the people to know that their diseased brethren are cared for with a parental solicitude. We ought to expect the best of results from Mr. Wilder's energy and administrative ability.—*April 22, 1873.*

A ROYAL VISIT TO THE LEPERS.

This we respectfully suggest. The presence of His Majesty at Kalaupapa would have a most inspiring effect upon his unhappy subjects, who are necessarily exiled; and also upon all others throughout the Kingdom, on observing this evidence of a paternal care for the saddest and most hapless outcasts of the land. There is no fear of contagion in merely looking at this dread disease, therefore we respectfully suggest to His Majesty to visit Molokai. And if a noble Christian priest, preacher or Sister should be inspired to go and sacrifice a life to console these poor wretches, that would be a royal soul to shine forever on a throne reared by human love.—*April 15, 1873.*

A CHRISTIAN HERO.

We have often said, that the poor outcast lepers of Molokai, without pastor or physician afforded an opportunity for the exercise of a noble Christian heroism, and we are happy to say that the hero has been found. When the *Kilauea* touched at Kalawao last Saturday, Monseigneur Maigret and Father Damien, a Belgian priest, went ashore. The venerable Bishop addressed the lepers with many comforting words, and introduced to them the good father, who had volunteered to live with them and for them. Father Damien formed this resolution at the time, and was left ashore among the lepers without a home or a change of clothing except such as the lepers had to offer. We care not what this man's theology may be, he is surely a Christian Hero.—*May 13, 1873.*



LETTER OF HIS MAJESTY TO THE LEPERS.

HONOLULU, April 20, 1873.

To my Friends at Kalaupapa :

By the hands of two members of the Board of Health I send you these words. You all know that on account of the prevalence of this disease of leprosy in the nation, a division of land has been set apart for the isolation of those affected. This measure has been for the good of the nation, and being a law, it must be executed. But it is indeed a sad thing to be thus separated from friends and loved ones ; how else, however, are the laws to be executed?

I can only say to you that you shall receive all the benefits that the Government can possibly bestow, and I trust that, in consultation with my advisers, everything will be done for you, consistent with a regard for the good of the whole people. May the Almighty Father watch over, protect and bless you, is the prayer of him whom the nation has chosen as its earthly Lord.

God preserve Hawaii Nei.

Love to you all,

LUNALILO.

We hope His Majesty will remember the good priest who has gone voluntarily to minister unto His Majesty's afflicted people on Molokai. If this is not a "faithful minister of the Gospel," we don't think he is to be found in these Islands.—*May* 16, 1873.

INDEX TO SUPPLEMENT.

	PAGE.
Organization of Board of Health, 1850.....	3
Report of Dr. Hillebrand, 1863	4
Chinese Leprosy, P. C. Advertiser, 1864.....	6
Leprosy Act of 1865.....	8
Amendments thereto	158, 160 184
Hawaiian Gazette on Leprosy, 1855	12
Dr. D. Baldwin on Leprosy, 1865.....	15
Dr. Hillebrand's Hong Kong Report, 1865.....	23
Purchase of Kalaupapa, Molokai, 1865.....	27
Establishment of Kalihikāi, 1865.....	29
Dr. Hoffman's Report, 1866.....	34
Report of the Board of Health, 1866.....	36
“ “ “ “ 1868.....	43
“ “ “ “ 1870.....	50
“ “ “ “ 1872.....	57
“ “ “ “ 1874.....	69
“ “ “ “ 1876.....	77
“ “ “ “ 1878.....	79
“ “ “ “ 1880	92
“ “ “ “ 1882.....	113
“ “ “ “ 1884.....	130
Report of Dr. Trousseau, 1873.....	65
“ Hawaiian Evangelical Association.....	75
“ Special Sanitary Committee, 1878.....	80
“ Dr. Emerson, 1880.....	92
“ Dr. Neilson	107
“ Dr. Fitch, 1882.....	117
Cases Recorded at Kakaako	161
Rules at the Branch Hospital	184
Appropriation for Lepers, 1878	186
Extracts from “ Nuhou,” 1873	188

LEPROSY IN INDIA.



BY AUTHORITY.

SUMMARY OF REPORTS,
FURNISHED BY THE GOVERNMENT OF BRITISH INDIA
TO HIS MAJESTY'S GOVERNMENT, AS
TO THE PREVALENCE OF LEPROSY IN INDIA;
AND THE MEASURES ADOPTED FOR THE
SOCIAL AND MEDICAL TREATMENT OF
PERSONS AFFLICTED WITH THE
DISEASE.

HONOLULU, H. I., 1886.



INTRODUCTION TO REPORTS ON LEPROSY BY THE GOV-
ERNMENTS OF BRITISH INDIA AND OTHER
FOREIGN POWERS.

It is about thirty years since Leprosy first attracted any serious attention in the Hawaiian Islands. Twenty years ago (1866) the dread disease had gained such a deadly hold upon the native race that the Hawaiian Government began to attempt to stamp out the scourge by segregation; for it had become a contest for the preservation, or destruction, of the aboriginal race. To judge by the number of cases in proportion to the population, the disease appears to be more virulent and malignant in the Hawaiian Archipelago than elsewhere on the face of the globe. What has been attempted and accomplished in this twenty years' struggle with a great national calamity appears elsewhere.

His Hawaiian Majesty's Government, anxious to provide every possible means for the treatment and understanding of the fearful malady, His Excellency Walter M. Gibson, His Majesty's Minister of Foreign Affairs and President of the Board of Health, addressed letters of enquiry to the Secretary of British India, to the Colonial Secretary of Ceylon, and to the Diplomatic and Consular representatives of the Hawaiian Kingdom in various parts of the world, where Leprosy was known to exist, making enquiry in respect to the character and treatment of the disease.

The response to these enquiries has been most generous, more especially from governments of dependencies of Her Majesty Queen Victoria. In the accompanying pages will be found reports from every section of the vast Empire of India, and its dependencies, from Ceylon, Hongkong, Siam, the Netherlands and their colonies, the Canary Islands, Norway, Spain, Mexico, Chili and Guatemala,

and an extremely interesting and valuable report from the famous leper institution of Tracadie, New Brunswick, Canada.

The report from the Secretary of India being so comprehensive and voluminous, it has been considered expedient to separate it from the other reports.

In grateful recognition of the sympathy of other afflicted nations, this collection of reports, together with the sad history of its own affliction, is presented to the world by the Hawaiian Government in the devout hope that the Almighty, in His great mercy, may ere long permit suffering humanity to find the means of mitigating the terrible scourge.

Honolulu, H. I., 1886.

CIRCULAR LETTER.

ADDRESSED TO HIS MAJESTY'S CONSULAR REPRESENTATIVES IN VARIOUS
COUNTRIES IN WHICH LEPROSY PREVAILS.

DEPARTMENT OF FOREIGN AFFAIRS, }
HONOLULU, February 5th, 1885. }

SIR:—His Majesty's Government is engaged in the work of procuring, from all the best available sources, information as to Leprosy, and the social and medical treatment of lepers in other countries. I shall feel obliged if you will assist the Government in this matter by sending me such information as you may be able to obtain inin regard to these subjects.

The points on which the Government is chiefly desirous of being informed are the following:

To what extent does Leprosy prevail in.....?

Has Leprosy been the subject of special legislation in.....?
If so please procure copies of the Statutes now in force.

Does the Government of..... enforce segregation of Lepers? If so what steps have been taken to provide for such segregation?

Do any hospitals or asylums for Lepers exist in.....? If so please obtain full information as to those establishments and state whether they are supported by private charity or by the Government.

What is the prevalent popular opinion as to the contagiousness of Leprosy, and do healthy persons carefully avoid those who have the disease?

I enclose a number of copies of a printed list of questions which will form a useful guide in prosecuting this enquiry. I shall be obliged by your submitting them especially to any medical men who may have had opportunities of studying the disease as manifested in

I have the honor to be, Sir,

Your most obedient servant,

WALTER M. GIBSON,
Minister of Foreign Affairs

[ENCLOSURE.]

QUESTIONS REGARDING LEPROSY.

The following interrogatories were prepared in 1862 for the British Government by a Committee of the Royal College of Physicians to assist in a similar enquiry to that now being instituted by the Hawaiian Government. Although some of them call for information of a technical character, which few persons are able to furnish, it has been thought desirable to produce them in full. The information more particularly desired is as to the prevalence of the disease, the way in which by law or by custom lepers are dealt with, the accommodation provided for them by the State or by private charity, and all available facts bearing on the question whether leprosy is or is not contagious in each stage of development.

- 1—Is leprosy known in? If so, be pleased briefly to describe it as it occurs there.
 - a. Are there several different forms or outward manifestations of leprosy? If so, by what names are they respectively known.
 - b. Are these several forms, in your opinion, only varieties of one common morbid state? or are they specifically distinct diseases, having no affinity with each other?
 - c. Please enumerate succinctly the more obvious and distinguishing characters of each form of leprosy which you have seen.
- 2—At what age does the disease generally manifest itself, and what are usually the earliest symptoms observable?
- 3—At what period of life, and within what time, does the disease usually attain its full development? and at what period of life, and after what time, does it usually prove fatal?
- 4—Is the disease more frequent in one sex than in the other? If so, in what proportion?
- 5—Is it more frequent among certain races? among the white, the colored, or the black population? and in what relative proportions?
- 6—In what condition of society is the disease of most frequent occurrence, and what are the circumstances which seem to favor its development in individuals, or in groups of individuals?

Please to enumerate these circumstances under the following heads:

- a. The character of the place or district where the disease most frequently occurs in respect of its being urban or rural, on the seacoast or inland, low, damp, and malarial, or hilly and dry.
 - b. The sanitary condition of the dwellings, and of their immediate neighborhood.
 - c. The habits of life, as to personal cleanliness or otherwise.
 - d. The ordinary diet and general way of living.
 - e. The occupation or employment.
- 7—What conditions or circumstances of life seem to accelerate or aggravate the disease when it has once manifested itself in an individual?
- 8—Does the disease appear often to be hereditary? Have you known instances where one member only of a family has been affected while all the other members remained free from any trace of it?
- 9—Have you reason to believe that leprosy is in any way dependent on, or connected with syphilis, yaws, or any other disease?
- 10—Have you met with instances of the disease appearing to be contagious, in the ordinary sense of that term, *i. e.*, communicated to healthy persons by direct contact with, or close proximity to, diseased persons?
- a. If so, in what stage was the malady in the diseased person? Were there ulcerations with a discharge?
 - b. Please to describe briefly the case or cases of contagious communication which you have seen yourself.
 - c. Does the disease seem to be transmissible by sexual intercourse?
- 11—Are persons affected with leprosy permitted in.....to communicate freely with the rest of the community? or is there any restriction imposed, or segregation enforced, in respect of them?
- 12—What public provision is made for the reception and treatment of the leprous poor? Are they admitted into the general hospitals? or are there separate infirmaries or asylums provided for them?
- Please to describe the structural and sanitary conditions of such buildings and the arrangements made for the medical and hygienic treatment of the sick in them.

13—Can you state the number of leprous persons maintained at the public expense in.....?

14—Have you reason, from personal knowledge, to believe that the disease has been of late years,—say during the last 15 or 20 years,—on the increase in.....or otherwise. And if so, please to state what in your opinion may have contributed to its increase or its diminution.

15—What results have you observed from the hygienic, the dietetic, or the medicinal treatment of the disease? Does leprosy ever undergo a spontaneous cure? and if so, at what stage of the disease?

Are you aware what proportion of the leprous poor treated at the public expense in.....recover wholly or partially?

16—What is the estimated population of.....? and when was the last census taken?

Is there a general and uniform registration of births and deaths, including the causes of death? and if so, how long has such a registration existed?

17—Can you state the name of the townships or districts in which leprosy prevails most, and give the number of lepers and the population in each of such townships or districts?

LEPROSY IN INDIA.

FROM A. MACKENZIE, Esq., C. S.,

Secretary to the Government of India,

TO THE MINISTER OF FOREIGN AFFAIRS

TO HIS HAWAIIAN MAJESTY,

HONOLULU.

Home Department.

Medical.

SIMLA, the October, 1885.

SIR:—I am directed to acknowledge the receipt of your letter, dated the 12th March, 1885, addressed to the Secretary to the Government of India in the Foreign Department, in which you desire to be furnished with information as to the prevalence of leprosy in India, and especially with regard to the measures adopted for the social and medical treatment of persons afflicted with the disease. It is observed that the Hawaiian Government proposes to publish the results of the general enquiries which are being instituted into the subject as soon as they have been collated.

2—In reply I am to forward a copy of the papers noted in the annexed schedule, giving the following particulars, in more or less detail, in regard to the leper asylums which at present exist in India:

- (1) The number of such asylums;
- (2) How each asylum is supported, that is, whether by public or private funds, or both;
- (3) The number of lepers treated in each of the asylums during the years 1883 and 1884, with the results; and
- (4) The structural and sanitary conditions of such asylums, and the arrangements made in them for the medical and hygienic treatment of the sick.

3—With reference to the questions asked in your letter of the 12th March, 1885, in respect to which the Hawaiian Government is chiefly desirous of being furnished with information, I am directed to say firstly, as regards the prevalence of leprosy in India, that the disease prevails to a greater or less extent throughout British India, but

that there appears to be at least three centres of comparatively intense prevalence, viz. :

- (a) The Beerbhoom and Bancoora Districts in the Lower Provinces of Bengal ;
- (b) The Kumaun District in the Northwestern Provinces ;
- (c) The Deccan and Konkan in the Bombay and Madras Presidencies, respectively.

Details regarding the distribution of the disease throughout India will be found in the papers enclosed and in the tables attached to this letter, which have been compiled from the reports of the census taken in the beginning of the year 1881. These statistics cannot be accepted as absolutely correct, because the registration of lepers in general census operations is liable to error for the following amongst other reasons :

- (a) That Leucoderma is apt to be classed as leprosy ;
- (b) That the disease is not recognized by natives until it is at an advanced stage ; and
- (c) That affected females of the house are carefully concealed, the disease being in some parts of the country regarded as one which entails disgrace.

The figures may however be taken to represent an approximation to the facts.

4—Leprosy has never been made the subject of special legislation in India, and no orders have been issued by the Government of India for the enforced segregation of lepers.

5—As regards the number of hospitals or asylums specially designed for the reception and treatment of lepers, I am to say that there are in all sixteen separate Leper Asylums in India, but that it is the practice in many places for lepers to be treated in separate wards of other institutions such as general hospitals and poor houses. In the District of Bancoora, in the Lower Provinces of Bengal, where the disease is specially prevalent, the lepers in the jail are kept apart in a special ward. Of the sixteen asylums which exist in India, five are maintained partly by public funds and partly by private charity, nine are entirely maintained by public funds, and two are wholly supported by private charity.

6—The Government of India is not in a position to say with certainty whether leprosy is generally regarded by the natives of India as contagious or not. Persons afflicted with it are without doubt regarded in most places with aversion, but this feeling is probably due rather to the disfigurement and mutilations occasioned by the

disease, than to any apprehension of its infectious character. In some parts of the country as above stated, sufferers from the disease are considered to be disgraced and are consequently shunned. On the whole, however, it is believed that the medical evidence tends to show that the disease is not contagious. In support of this view it may be mentioned that not a single servant of the asylum at Almora in the Kumaun District of the Northwestern Provinces appears to have contracted the disease during the thirty-one years for which there is information. Such evidence as is available tends to show that the disease is to a large extent hereditary, but that the influence of heredity is much more strongly marked in the female line of descent. For instance, it appears that the issue of a marriage between an affected woman and an affected man is far more likely to inherit the disease than the issue of a marriage between an affected man and an unaffected woman.

7—I am, in conclusion, to forward the reports mentioned in the annexed schedule, and to express the hope of the Government of India that they will afford assistance in the conduct of the investigations into the subject which are being undertaken under the orders of the Hawaiian Government.

I have the honor to be, Sir,

Your most obedient servant,

A. MACKENZIE,

Secretary to the Government of India.

INDIA.

FROM DR. W. J. MOORE, SURGEON-GENERAL WITH THE GOVERNMENT
OF BOMBAY.

Extracts from Report of August 12th, 1885.

Having from time to time paid considerable attention to leprosy, I may perhaps be pardoned adding a few remarks to this report. Leprosy has been known from early times. In France, in 1226, Louis VII. left legacies to 2,000 leper houses, and old records show that leper houses were once common in France, Germany, Ireland, and England. At present the malady corresponds as regards intensity with the belt of maximum heat of the globe; or in other words with those countries where great heat, comparative scarcity of fresh vegetables, and manner of life generally amidst unsanitary conditions, exert the most depressant effect on the human system. Although leprosy occurs in Norway, Sweden, &c., it is not now the same inveterate disease observed in the East. Leprosy has been attributed to an insufficiency of salt, but I have seen the disease throughout the semi-desert districts of Western India where the principal product of every village is salt, and even on the shores of the Great Sambhur Salt Lake. It has been attributed to a vegetable diet, but it attacks meat eaters. A too exclusive fish diet has been thought to be the cause, but it prevails where the people never see fish. It has been attributed to new rice, but people suffer from it who living on bājri, only use rice as a luxury. It has been supposed due to malaria, but so have most other maladies, and it has never yet been proved that such an agent as malaria exists. It has been considered hereditary, and the evidence seems to show, that it like some other maladies may sometimes be hereditary. It has been regarded as contagious, and there are instances recorded which seem to demonstrate this view. It has been considered a form of hereditary syphilis, which we know to be both hereditary and contagious. Lastly, it has been attributed to unsanitary conditions generally.

The features of resemblance between syphilis, especially as seen in former years, and leprosy are so great that they cannot be ignored; and even those denying the identity of the diseases admit a form of leprosy which they term syphilitic leprosy. And it is an unquestionable fact that the decline of leprosy in various countries has proceeded *pari passu* with the progress of sanitary measures. And now I come to the reason I have ventured these curt remarks, which might be supported by many additional arguments and facts. If leprosy, is as I hold it to be, (except in the minority of instances when originating by contagion), a latent syphilitic inherited constitutional taint, developed into activity in certain constitutions by surrounding unsanitary conditions, the means of preventing leprosy is not in reviving the antiquated system of leper asylums, but by measures against the spread of syphilis and by sanitation in the fullest sense of the term. If leprosy is not what I hold it to be, we have still sufficient evidence that the great prophylaxis is sanitation. In sanitation I include the prevention as much as possible of whatever entails a state of human system below par, such as the cheapening of salt (an article of the greatest importance in the human economy), plentiful food, good clothing, suitable and above all dry lodging, drainage, conservancy—in short, everything tending to improve the condition of the population of a country. Leper asylums are good and charitable, but will not cure, eradicate or prevent leprosy. There is no known cure for leprosy when once contracted. Lepers taken into an asylum and well cared for often apparently recover, but the apparent recovery is this: The cathetic debilitated leper becomes temporarily a robust leper, but he remains a leper still, and the disease eventually breaks out again. Apart from charitable motives, therefore, I would not recommend the Government spending large sums on leper asylums—such, for instance, as would be entailed by a “State Leper Asylum,” as mentioned in Government Resolution No. 2009, dated 11th June, 1883. A more certain, albeit slow progress will result from sanitation in the broadest sense of the term, which comprises the moral and material amelioration of the condition of the people.

CALCUTTA.

FROM BABU MADHUB CHUNDER GHOSE, L. M. S., MEDICAL OFFICER,
LEPER ASYLUM.

Extracts from Report, 10 July, 1885.

In the present state of medical science, there is no specific by which the disease of leprosy can be completely cured. Palliative treatment only can be afforded; but even under this palliative mode of treatment the lepers are often very much improved in their condition,—their sores heal up, patches often disappear, and sensation is sometimes restored to the benumbed parts. Sometimes the improvement is so marked that it is difficult for a casual observer to determine whether the patient had ever been afflicted with leprosy; but there is a great drawback to the successful treatment of cases; that lepers as a rule, do not seek admission to the Asylum till they are in a very advanced stage of the disease, when their nearest relatives shun them and expel them from their homes, and for whom now the best medical treatment would avail nothing.

BENGAL.

FROM BABU R. M. BANERJEE, SUPERINTENDENT OF BANKOORA JAIL,
BENGAL.

Extract from Report, 25th July, 1885.

The medical treatment of leprosy is not a very hopeful one. Believing as I do that leprosy when once thoroughly engraved in the constitution is perfectly incurable, I am not very sanguine in the

efficacy of drugs in its cure. The best thing we can do with such cases is to feed them on nourishing diet; and so long as we can keep them in good health, they can withstand the encroachment of the disease; but when from any cause their health breaks down, the disease breaks out in its terrible and horrid form, which no amount or excellence of medical substances can cure. Any intercurrent diseases are promptly attended to with suitable medicines.

CIVIL HOSPITALS.

FROM W. WALKER, ESQ., INSPECTOR-GENERAL OF CIVIL HOSPITALS, N.
W. P. AND OUDH.

Extract from Report 26 June, 1885.

No results of special treatment, as I explained in my report for the year 1883, are available.

Medical men in these provinces have, after full investigation, *ceased to attempt a cure of leprosy*, and content themselves by endeavoring to retard the ravages of the disease by attention to diet and cleanliness of persons.

I quote the remarks above referred to, as they explain the position more fully:—

“I may say that medical treatment in the sense of attempting a cure of the disease has been abandoned, not only in these provinces, but all over India. Extensive experiments were made in 1875, 1876 and 1877, with regard to the efficacy of certain systems of treatment, and were found to be equally unsatisfactory. If the Government will refer to Proceedings in the Medical Department, Nos. 20 and 23, dated March 10, 1877, there will be found the results of a fair trial given to gurjan oil, once a vaunted cure for leprosy. The results of this experiment may be taken as a fair example of the conclusions which have been forced on all trustworthy observers—namely, that good nourishing diet, cleanliness and friction to the skin with any oil are the only satisfactory means of retarding the progress of the disease. No other specific treatment is now at-

tempted in any of our asylums. The patients are regarded as incurable, and are only subjected to medical treatment when attacked by complications which may be hopefully dealt with."

All attempt at specific treatment has been abandoned for some years as useless.—[*J. Fairweather, Brigade Surgeon, Inspector-General of Civil Hospitals, Punjab.*]

BURDWAN.

FROM SURGEON C. H. JOUBERT, M. B. F. R. C. S., BURDWAN.

I have ascertained that out of a population of 2,030,000 in the Burdwan District, inhabiting 5,181 villages or towns, 4,915 persons in 1,885 villages are classed as lepers. I say "classed" because I am certain that many cases of secondary and tertiary syphilis are looked upon by the natives of this part of the country as leprosy. Many lepers that I have examined have attributed the outbreak of their symptoms to syphilis or to salivation for the cure of syphilis, and a great confusion of the two diseases exists in the minds of most natives of this district.

We may, therefore, fairly consider that amongst these 4,915 cases are a considerable number of persons suffering not from leprosy but from syphilis, and put them against those lepers whose symptoms, if merely those of anæsthetic leprosy without eruption, and as yet unrecognized by their neighbors.

This number gives a percentage of 0.24 of the total population. Roughly the greatest percentages of cases appear to exist in the portions of the district on or bordering on the laterite soil and jungle lands, while the smallest percentages are found in the tharrah in the south and east of the district comprising the alluvial lands lying between and near the great rivers. The disease is less common among Mussulman than Hindus.

The proportion of females affected was not stated in all the returns; but out of 3,015 lepers 564 were females, or about one to every five males afflicted.

With regard to the propagation of the disease either by contagion or hereditary taint I may mention here that amongst 30 lepers whose cases were detailed, I only found 13 who acknowledged to any hereditary history of the disease. Of the 30 ten acknowledged to having had syphilis and twelve denied both syphilis and hereditary leprosy. As regards contagion, of the 30 only one man attributed his disease to having lived with other lepers and denied hereditary taint; but as he also stated that in his village (in Beerbhoom) there were ten or twelve other lepers out of a population of one hundred or so, the denial of hereditary taint is almost worthless.

In my opinion, I have seen nothing in the cases of leprosy that have come under my observation to support the popular idea that the disease is contagious, and the minute pathology of the disease, shewn by recent observers to be a disease of the nerve trunks, is strongly against any such theory. The purely tubercular form of the disease is much more rare than the anæsthetic. In my opinion, the disease is chiefly propagated by hereditary taint, appearing usually in adults.

HOOGHLY.

FROM DEPUTY SURGEON-GENERAL R. COCKBURN, HOOGHLY.

Leprosy is very rare in this district. The few cases that have come under notice are chiefly professional beggars coming to implore for alms. The Hindus, in the Sanskrit works, state four forms of the disease. I have seen only two varieties; in short, they are the same only in different stages. In one, the disease commences with tingling sensation of a patch or patches of skin in several places, which become benumbed or insensible, and the coloring pigment of the skin is removed, the part assumes a peculiar appearance tending to a pink or reddish hue, the skin becomes thickened, and thus the affected part appears circular; ultimately the tip of the nose and the lobes of the ears and the skin of the eyebrows become swollen and reddish, and the ends of the fingers and toes, especially the big toe, gets painful and flattened, swollen and become of reddish hue; and

in some the disease remains stationary in this stage for years, and even till death of the patient, or the disease advances to ulceration and loss of joints. The ulceration generally commences in the toes and fingers first, and as it advances the joints of the fingers and toes are separated. A sort of serum, like discharge, exudes through the ulcerated part, and the regular pus is not formed. When healthy pus is discharged from the ulcer it is generally considered that the ulceration stops and healing commences. The other variety is of the same nature in the first stage, but in the second stage dry gangrene sets in on the toes, in the finger or fingers and toe or toes, and it proceeds as far as where the ulceration commences; and if the progress of the disease is to stop, then healthy pus is seen, and the gangrene part is separated and the ulceration heals up with healthy granulations. I have seen in several cases the toes and the rest of the foot fall off by dry gangrene in this way of the ankle where the ulceration commenced and healed up.

The disease is generally observed to commence between the age of 25 and 50, but it has appeared in earlier years, but never seen by me to begin above the age of 50. The earliest manifestations are the tingling and benumbed state of the skin of some parts, or the swelling of the tip of the nose, lobes of the ears and its reddish hue with or without insensibility of the parts.

I have seen the full development of the disease generally in adult age and in some cases before puberty; I have rarely seen any cases to prove fatal. I have seen more lepers among men than in women, and more among Muhammadans than among Hindus, but it is hard for me to give the exact proportion of it. The leprosy is more frequently seen in the lower order of the people, such as beggars; but the disease has been seen among the richest also, and it appears to spare no condition of life.

The sanitary conditions of the dwellings of the inhabitants of this district are nearly all alike, and there is nothing peculiar in any part of the district deserving mention. The habits of life as to personal cleanliness, I can say that the Hindus of this district are generally most clean, daily bathing and washing their clothes and utensils and rooms; but the Muhammadans, excepting those who are in good condition, are not comparatively so clean as their Hindu brothers. They do not bathe, wash and clean every day.

The diet of the people is in general vegetables, milk, fish and ghee. In addition to these the Mohammadans at times eat meat.

Their modes of living, excepting a few young Bengalis, is very temperate; they touch neither wine nor stimulating liquor of any sort; they are in general a race of cultivators.

The disease is hereditary. I have invariably seen the children of a leper become lepers, and one thing is peculiar, that the children of the leper generally get the leprosy at the age of the parent when he first got the disease. I have seen one member of a family to be affected while other members remained free from it; but the man who had the disease generally ascribed it to his association with lepers. I have seen several cases of the leprosy arise as if it were the after consequences of syphilis.

I have every reason to believe the disease to be contagious. I have seen a wife with her two children contract the disease by remaining with her husband after he had the disease on him, while three other children who left him for the disease remained free. The disease of this man had not advanced to the stage of ulceration.

I know a boy who became a leper after having bought a pigeon from a leper and constantly handling it, though his parents were free from the disease, and he had no communication with any other leper. I have seen two healthy, strong, good constitutional men having no hereditary tendency for the disease become lepers after a year's attendance on the lepers in a leper asylum. One was attendant to supply food from the bazaar, and the other was a water-bearer in the leper asylum.

I cannot say whether sexual intercourse alone can give the disease or not; but when contact gives it, as a matter of course the sexual intercourse must communicate.

In the district of Hooghly lepers are not allowed to mix freely with the rest of the communality. The people shun a leper of their own accord, as they have a general belief in the contagion of it. There is no leper asylum in the district; in fact, it is not needed in the place, as there are very few lepers in the country.

SERAMPORE.

FROM DR. JAMES GREENE, SERAMPORE.

I have no doubt leprosy is propagated by sexual intercourse, as I have seen several instances at the Serampore Hospital, when the disease was acquired in this way and mistaken at first for venereal. Diet has also a great deal to do with its production; most of the sufferers are from the homeless classes, beggars, etc., who live by begging, and it is well known that these people are supplied with grain of the cheapest and worst kind. Grain dealers, as a rule, set aside damaged and worm-eaten grain for distribution to this class; they seldom get animal food, living principally on diseased grain and vegetables with a taste of rotten fish occasionally. As far as my observation extends, climate does not seem to have any great influence in the production of the disease, though there is no doubt that the disease is one of tropical origin.

BANKOORA.

FROM BABU B. L. DUTT, M. D., CIVIL SURGEON OF BANKOORA.

Leprosy is a common affection in this district. It is generally limited to the poorer classes, and is infrequently seen in the well fed and rich. The Bowrees and Southal castes suffer most, and the dark-skinned are more prone to the disease than the fair-skinned, but this may be due to the greater preponderance of the former over the latter. The pure Aryan, as represented by the high caste Brahmin, is least susceptible to the disease—a fact borne out of my limited observations in the Burdwan Leper Hospital and Pooree District. The pure or somewhat mixed aboriginal as the Southal or the

Bowree caste is, on the other hand, most susceptible as hereinbefore observed, and the intermediate castes appear to be more or less liable to the disease in proportion to the aboriginal blood in them. This, if proved by an extensive number of accurate observations, will establish an important fact.

Anæsthetic form of the disease is the most common, tubercular is rarely seen, but the mixed form is more frequent. Eruption is observed in most cases, attended often with considerable anæsthesia or diminished sensation. Atrophic changes, distortion, and finally ulceration, and loss of substance of the hands and feet were not absent in a single case I observed in this district.

Syphilis, venery, poverty and bad living are great exciting causes of the disease.

The treatment adapted in the Bankoora Dispensary was liberal diet, cleanliness, and the continual administration of tonics. Under this plan two of the cases improved, and the progress of the disease rendered slow; but as soon as the treatment was left off, or the patient was reduced in health by febrile attacks or other causes, the disease broke out afresh with renewed vigor.

MIDNAPUR.

FROM R. L. MATTHEW, ESQ., CIVIL SURGEON OF MIDNAPUR.

The native doctor in charge of the Ghatal Dispensary, in giving the details of a few cases that passed under his observation, states that the disease in three of the cases was due to hereditary influence, and in two was said to have been caused by contagion.

He reports that milkmen, washermen, weavers and silkspinnners are the classes most frequently attacked.

Whether contagion plays an active part in disseminating the disease appears doubtful; but the vast majority of the people here consider it contagious, and will not, as a rule, hold any communication with persons so affected.

GHATTAL DISPENSARY.

FROM BABU RAJCUMAR DOSS, NATIVE DOCTOR IN CHARGE OF GHATTAL
DISPENSARY.

As to the distribution and causation of leprosy within the precincts of this town and its immediate neighborhood, from careful investigation I have come to the conclusion that the disease was contracted in two ways, primarily and secondarily.

In primary attacks the disease had its origin from syphilitic disorders with an injudicious administration of mercurials by native quacks.

In secondary cases it has either occurred by contagion, or hereditary influence.

Most of the cases examined were milkmen, washermen, weavers and koibortos, depending on cocoon cultivation, all of whom have to deal with dirty things for the sustenance of their lives.

Cases cited. A weaver boy, aged 12, hereditary influence, mother's maternal uncle and a nephew diseased.

A male Hindu. His eldest brother, with whom he laid down and ate, was a leper; also the sister, aged 36, who contracted the disease at 13.

A male Hindu, aged 25, contracted the disease from another man with whom he worked and slept.

RUTHGORA.

FROM BABU BAMA CHUM CHATTERJEE, RUTHGORA.

True cases of leprosy with hereditary taint and special peculiarities to the locality in which the people live are wanting here. In the course of a year a very scanty number of patients, such as four

or five, attacked with ulcers simulating leprosy, are found to attend the dispensary. In most of these cases it is found on enquiry that they suffered from venereal disease, acute rheumatism or from any foul ulcer, for the cure of which they made bad use of mercurial preparations in the hands of quacks before the leprous ulcers broke out. In this quarter the abuse of mercury even in simple diseases tends to the development of ulcers simulating leprosy.

GURBETTA.

FROM BABU PROSURMO COOMAR SEIN, GURBETTA.

This disease is prevalent to a certain extent among the people of the village of Gurbetta. The cause is, I think, this place is comparatively crowded, and as the pilgrim road passes through it, it is the haunt of the persons from the different parts of India who bring with them the contagion of many sorts of diseases. After taking charge of this dispensary I have treated 20 lepers. To some of them this disease was hereditary, to some it was owing to the contagion, and to others it was the effect of using mercurial medicines.

CONTAL.

FROM BABU MODHOO MADHUB MOOKERJEE, CONTAL.

The lepra is a disease of the skin. It has two forms, tuberculated and non-tuberculated; the latter is the usual case in Bengal. As far as my knowledge goes, this disease is neither contagious or infectious; it is rather hereditary. If it be contagious or infectious, then it would have occurred among all the prisoners in the jail, as I have seen several cases of lepra patients in the Hooghly and Hazaribagh Jails, where they live with other prisoners. Some say the cause of the disease is uncleanness and dirt, but I am not of that opinion. The gurjun oil treatment is the best for this disease.

MIDNAPUR.

FROM SITANATH GUPTO, MIDNAPUR.

This gentleman, a native doctor, cites the following case: The patient states that he was attacked with syphilis some twenty years before, and he freed himself from the disease with the use of mercurious vapor baths. But two years after this, i. e., some twenty years ago, a variety of eruptions appeared on the dorsal surface of the right hand; this was accompanied with local anæsthesia of the part. The eruptions healed with the use of some native oil, but the anæsthesia still exists. Six months subsequent to this surrul ulcers appeared on the ends of fingers and toes, and symptoms of true leprosy began to appear gradually.

MOORSHEDABAD.

FROM DR. S. M. SHIRCORE, C. S., MOORSHEDABAD.

Leprosy exists in an unusual degree in Moorshedabad, which stands fourth in the list of districts in the Provinces of Bengal, Behar and Orissa, as well as of Assam. Beerbhum is at the head of the list. Then come Bancoorah and Burdwan, and Moorshedabad is next.

Among a total population of 1,353,626, there were in the year 1872 1,776 lepers, namely, 1,534 males and 242 females, giving a percentage on total population of leper males, .2377; leper females, .0342; total, .1312. For all practical purposes these statistics are applicable to the present time.

The male portion of the population of this district, like that of other parts of India, suffer from leprosy greatly in excess of the

female. The normal population shows a considerable excess of females—the figures being, males 645,335; females, 708,291—and yet the proportion of male lepers to female lepers is 6.33 to 1.

As far as my knowledge of the lepers of this district extends, it appears that the disease is more common among the Muhammadans than the Hindus.

Leprosy exists to a far greater extent among the people who reside in that portion of the district which lies on the west of the River Bhageeruthu. The twelve thaunahs on the east of the River Bhageeruthu, with a total population of 612,203, have only 403 lepers. Whereas the 13 thaunahs on the west side of that river, with a total population of 741,423, have no less than 1,373 lepers.

As far as I have been able to ascertain, there is nothing peculiar in the condition or habits of the people who reside in that part of the district, where leprosy is localized to such an extent, that differ from those of the people of other parts. But there is a marked difference in the natural formation of the country, the soil of the one being totally different from the other.

The District of Moorshedabad is divided into two somewhat unequal portions by the River Bhageeruthu, which flows through it in a south-easterly direction. The country on the right bank (that is on the west of the river) is undulating, and generally well-raised above the highest flood level of the river; and the soil in its composition is decidedly laterite, and resembles that of the plains of Upper Bengal. Directly the river is crossed, the change is unmistakably marked. The surface of the country is generally below high flood level, and the soil is composed of sand and sand mixed with clay, and is, in fact, identical with that of the Gangetic delta. The undulations disappear, except where old beds of the river occur, and a flat country takes its place.

I have stated that Beerbhum heads the list of districts in Bengal, Behar, Orissa and Assam in which leprosy exists to an unusual extent. With a total population of 695,921 there are in that district 2,872 lepers, giving a percentage of .4127 on total population; and it is deserving of remark that there are more lepers among the people who reside within the jurisdiction of the five thaunahs in this district—Bhurutpure, Khurgram, Ramporehaut, Nulhati and Pulsa, which border on Beerbhum, than there are among the whole population of the remaining twenty thaunahs.

As to the supposed cause of leprosy, my experience does not tend

to the belief that the disease is contagious in its nature unless by *direct* inoculation, and even then we are not necessarily in possession of sufficient evidence of crucial test to enable us to say positively that the disease would be transmitted from one person to another by means of direct inoculation.

On the other hand, there is no doubt that in a certain proportion of cases the cause of leprosy can be satisfactorily traced to heredity. Making, however, full allowance for these cases, there still remain a large number of cases which in the absence of any other known cause must be admitted to have engendered spontaneously, and for the origin of these cases we must look to some other causes. On the whole, I am inclined to the opinion that epidemic influences cannot be altogether absolved of a certain share in the production of leprosy. At all events, I think the facts I have given in this report sufficiently justify such an opinion, and suggest full and searching investigation in this direction.

DUMKA.

FROM THE OFFICIATING CIVIL SURGEON, S. P., DUMKA.

There are 515 lepers in this district, or, in other words, .0408 per cent. of the population are lepers. Out of this number 314 lepers were returned from Dumka and Jamtarrah sub-divisions, principally from the villages bordering the District of Beerbhum. These are chiefly Bengali villages. As a rule, the Bengali villages are crammed with houses with defective drainage and ventilation. The cowdung, house refuses and other sorts of filth are piled up close to the house in these villages. These are the main peculiarities of these villages. The sufferers are chiefly poor and low class people, who remain overcrowded in small huts which scarcely protect from the rain and the inclemency of the weather. During my inspections of the villages from which the largest number of cases were returned, I examined fifty-nine cases in twelve villages, and found *that in thirty cases the disease was propagated by hereditary trans-*

mission. In one case a woman got the disease about two years after her husband, from which it appears it was produced by cohabitation. Of the thirty-eight remaining cases, only four were attributed to syphilis and the use of mercury. Fish is scarce in the villages where leprosy is prevalent, and it cannot be traced that the use of putrid fish has anything to do in the causation of the disease in the parts of this district where it is prevalent. The poor people who subsist chiefly on rice, dall (kalacy, khesari, etc.,) and sag suffer most from the disease.

I have only seen very few cases of leprosy among the Sonthals, and I believe it is not so common among them as among the Bengalis; I mean the low class Hindus and Mussulmans. This may be probably owing to the difference of food, mode of life and better hygienic condition of the Sonthal villages.

The proportion of male lepers is a little more than three times than the females, and the anæsthetic variety of the disease is more common in the district.

Dr. Dougall's plan of treatment with gurjun oil was not so successful in my hands (in the few cases I tried) or in any of my subordinates in this district.

NUDDEA.

FROM C. E. W. BENSLEY, ESQ., M. D., C. S., OF NUDDEA.

From the cases which have come under my observation it seems to me that hereditary taint and the abuse of mercury in venereal diseases are the two main causes of this disease. Of these two, again, the latter appears to be the more common. Constant association might be the cause of the disease in some cases, but I am hardly in a position to give a definite opinion on the point.

The cases which came to the charitable dispensary for treatment were all treated with gurjun oil. A marked improvement was perceptible at first in a few of the cases, but the symptoms reappeared soon after the patients discontinued to use the medicine. There is one great drawback to the examination of the result of the treatment, and it is that no patient is patient enough to use the medicine for any considerable length of time.

RAJSHAHYE.

FROM E. C. BENSLEY, ESQ., C. S., OF RAJSHAHYE.

Doubtless the census figures (274 lepers, or a proportion of one to four, 783) of lepers are not strictly accurate. In the first place it is a disease which the people try to keep out of sight as much as possible, those only who are actually maimed by the disease being brought to notice, and again, the returns for females would be defective, because of the Zenana system prohibiting any strict scrutiny. I do not think it has anywhere been shown that males suffer any more from the disease than the females, and yet the census returns show 229 of the former against only 45 of the latter. These, then, are circumstances which would tend to understate the facts; but, on the other hand, there is no question whatever that a large number of the census cases were cases of a cutaneous affection, popularly known as "white leprosy," which is not leprosy at all. If these, then, were eliminated, and an allowance made for failure in recording female cases, I imagine the figures would not vary much from what they now stand.

Lepers, as a rule, represent to a great degree a floating population. They are much on the move, generally visiting places where shrines and holy places exist. In the District of Baraich, in Oudh, there is a temple and a small pool of water which are visited yearly by a very large number of lepers. In the season these lepers, to the number of thirty or forty, may be seen closely packed in the pool with their heads above water, and about the same number or more around the pool ready to jump in directly vacancies occur, the water all the time being filthily dirty and highly offensive. The pool of water is said to be blessed by the Brahmins and to possess curative properties.

I am unable to enter into the causes that predispose to the disease. I think it is allowed on all sides that poverty, filth and impoverished diet are not important factors of the disease, and popular notion exists among the natives that a fish diet produces the disease and

aggravates it when it exists. The natives all believe in this disease being contagious, and one man was so impressed with this belief, as also with the loathsomeness of the disease, that he begged of me to keep him apart from the rest. This man was treated for a long time with chowmoogra oil, and latterly with gurjun oil, and although there was no apparent improvement in the disease, the man had much improved in health, and the progress of the disease was arrested.

JULPAIGURI DISTRICT.


FROM W. DUNCAN, CIVIL SURGEON FOR JULPAIGURI DISTRICT.

The district lying under the Bhootan range of hills extends from Assam to the Darjeeling District, a distance of about 90 miles. From the foot of the hills the district extends southward, with a varying breadth of from 40 to 60 miles. The country is generally level; in the northern portion, or *terai*, covered with dense jungle of wood and grass, and in the south it is one extensive rice-cultivating tract. In the *terai* the inhabitants belong to the Mech tribe. There are also a considerable number of Neapalese, and some few imported Dhangurs from Sonthal. The Mechs appear, looking to physical conformation, an admixture of the Mongolians and the races of the plains. The south of the district is peopled by Bengalis, Hindustanis, and a mixed breed from the two, and with the hill tribes. The people may be considered a rice-feeding population. Flesh and fish with milk, articles of food, are consumed extensively when obtainable. Some of the *terai* residents are said to be addicted to eating flesh in a putrid form. Rice, as usually found for sale, is of good quality; other and inferior varieties are, however, much in use. In the district the prevailing diseases are malarial fevers, dysentery, diarrhoea and resulting complications. About 50 per cent. of the population suffer from malarial cachexia in some form. Skin diseases, tinea and itch, are universally prevalent, few of the people being found without one or

RUNGPUR.

FROM BABU K. D. GHOSE, M. D., M. R. C. S., CIVIL SURGEON OF RUNGPUR.

The disease is distributed over the whole district and certain portions of it, in point of its prevalence, present a remarkable contrast to others. These tracts of extreme prevalence and comparative immunity present a marked difference in their physical features and in the character of the people inhabiting them, as also in the circumstances under which they live. During my travels of enquiry I found the disease more common towards the rivers than in villages far removed from them; but when the immediate banks are high, it is almost altogether absent from them. A marked contrast of this kind I observed in one part of the River Teesta. Either bank here is inhabited by Hindus of the fishing castes, but being of different sub-castes they do not intermarry or mix in other way. They follow the same occupation and live otherwise under similar circumstances. Among these fishermen on the left bank I could not find a single case, whereas among those on the right bank numbering about 80 individuals there were six lepers. In the laterite tract the majority of the lepers that I found were inhabitants of the alluvial portions of the tract. The villages where I found the diseases most prevalent are either on the banks of a river or surrounded by marshes and old river beds. Dry and high spots whether near a river or not enjoy a marked immunity from the disease. Other skin diseases such as itch, ringworm and psoriasis of a chronic character are very common in villages where lepers are found. The houses are low mat huts surrounded by dense jungle and clumps of bamboos. These latter overhanging the yards exclude the sun from them. In the occupation of fishing these people often immerse themselves in muddy water and smear themselves with mud for hours and pass sometimes a whole day in wet clothes. This constant contact of water with the skin, I fancy, has much influence in the production of the disease. It undoubtedly is a potent cause of the other skin diseases I found prevalent in these villages. In fact, the atmosphere



charged with vapor; their occupation requiring constant immersion in water; their damp, ill-ventilated habitations, and the want of clothing, all tend to interfere with the healthy functions of the skin. The people in these villages seemed to be extremely fond of their homes, and never emigrate. The population of a whole village I sometimes found related to each other, and married and intermarried among themselves and lived and died in it. I found a number of old people who told me that they never spent a night from home.

I examined and took notes of 378 cases, 253 males and 125 females; 286 were Hindus 92 Mussulmans. Only in eleven cases could I trace evidence of hereditary taint, but I have no doubt that there were others among them who either concealed the truth or were not aware of the fact of their parents or ancestors having suffered from the disease. In one instance I found that two brothers were diseased about the same time; but they could not inform me if any of their ancestors suffered from it. One cannot look into the circumstances of the origin of the disease in several of these cases without believing in contagion. That personal contact alone will not cause the disease is evident; but it may be said to be contagious in the same sense as typhoid fever or cholera is contagious, though not to the same degree. There is strong presumption that the malady is due to *contugium* or communicable germ, which takes root and flourishes under favorable circumstances, and these favorable circumstances are climate, soil and other hygienic conditions. These conditions alone cannot produce the disease; as under similar circumstances the disease does not originate. Again where the hygienic conditions are good, the disease, if introduced, will not spread, as it does not in some parts of the district, although so close to others infested with it.

Numbers of cases came to my notice in which the leprous individual remembers having lived in close proximity to some one else affected, or had distant relationship with other lepers, but there were 33 cases in which the persons lived in the same house with other lepers before getting it. In four of these 33 cases there was sexual intercourse with leprous individuals before the attack. In one village I found six individuals in different stages of the disease, more or less related to each other. A woman got leprosy first from a leprous husband who lived in another village. Her parents were not leprous. After her husband's death she came to live with her brother, and before she was a year in the house he got the disease.

In the course of six years three other individuals in the neighboring houses were affected. The oldest individual in this village assured me that before the woman returned home after her husband's death he had not seen a leper in that village.

DUIAGEPUR.

FROM J. W. W. WEBBER, CIVIL SURGEON OF DUIAGEPUR.

Leprosy is scattered throughout the whole district. The climate is bad, and there is only one mineral product in it, viz., lime, which lies in the form of Kunkur in scattered beds in several localities at various depths. The southern portion of the district is undulating; no mountains nor hills; a great deal of forest and barren land. The disease does not appear at all hereditary, most of those that I examined did not get the disease till long after puberty, and they said that they contracted it either from the wife or husband. As far as I could judge, most seemed to have got it through poverty, exposure, bad food and worse clothing—in fact, dirty habits. There are a good many well-off and even in independent circumstances suffering from the disease. Drinking water does not seem to have anything whatever to do with it. Scarcely anything has been done in the way of carrying out general treatment. Those coming under my own care have had the chalmogra oil treatment with very little benefit I am sorry to record.

CHUMPARUN.

FROM THE CIVIL SURGEON, CHUMPARUN.

Tubercular leprosy among the known cases is of very rare occurrence. I have only seen three or four cases during my residence here. Two varieties of the non-tuberculated form are more common, viz., the anæsthetic and the leucopathic; none are in any way contagious, and there is generally an hereditary history. All the cases I have seen or heard of are middle aged; they are of various castes and classes, but mostly beggars.

BACKERGUNGE.

FROM W. F. MURRAY, ESQ., CIVIL SURGEON OF BACKERGUNGE.

Leprosy is chiefly found in the vicinity of the following villages,—Bagody, Sorikal, Matahar, Amanatgunge, Moolady, Burrisal and Rooparjur. It is not, however, confined to these places, but scattered throughout the district. Lepers live apart from their families. They do not take food with the other members, neither do they cohabit with their wives. Persons who have leucoderma are not, as a rule, subjected to these restrictions, but those afflicted with tuberculous and ulcerating leprosy suffer most in these respects. In some cases the disease is undoubtedly hereditary, in other cases the causes cannot be ascertained. It is believed by the natives to be contagious, but from my experience this belief is not borne out by facts. When taken in the early stage, the progress of the disease is greatly influenced by the application of gurjun ointment, which certainly is most beneficial, and in many cases effects a complete cure. It is looked on by the Native Kobirajes as a specific.

JESSORE.

R. T. WRIGHT, ESQ., M. D., CIVIL SURGEON, JESSORE.

Six hundred and nineteen lepers are reported in the Jessore District. The sex is not distinguished, but it appears that only 54 inherited leprosy while 565 had no idea of its cause. They believe the disease incurable, so it is difficult to persuade them to submit to treatment, and twenty, who were treated with gurjun oil, received no benefit.

DACCA.

FROM A. CROMBIE, M. D., CIVIL SURGEON OF DACCA.

Eight hundred and fifty-two lepers (723 males and 129 females), or 4.595 in every 10,000 of the population are affected with leprosy in this district. The disproportion between males and females is probably due to a certain extent to non-registration of female sufferers, but it is believed to be a considerable degree natural. It is most prevalent in the high laterite parts of the district and in the low water-logged thaunahs where there is little or no natural drainage, where the soil dries by evaporation, and those districts return the smallest number of lepers which are alluvial and of medium elevation, with a comparatively free natural drainage. A certain rough relationship seems to exist between leprosy and malaria. I do not place any reliance on the figures supplied by the census returns as regards the actual number of lepers in the district. The people habitually confound leucoderma with leprosy on the one hand, and many cases of constitutional syphilis are considered as cases of leprosy by the laity. I am inclined to believe that there is more leprosy in this district than the census returns show.

CHITTAGONG.

FROM R. D. MURRAY, ESQ., CIVIL SURGEON OF CHITTAGONG.

Leprosy is not common in Chittagong and it is very difficult to get accurate information regarding its extent. Gurjun oil, with equal parts of lime water, used both internally, was the treatment adopted in all of these cases, and gave "more or less relief." None of the patients attended sufficiently long to enable one to judge of the

effects of the treatment; for gurjun oil is decidedly a slow acting medicine, and in cases where it does good or effectually cures it is only after many months' assiduous use. The disease does not appear to be specially localized. It has been most observed in the town, and usually among badly-off, ill-fed, up-country men, rather than among the aborigines, fakirs and vagrants of various sorts. Next to these Muhammadan ryots; then low class Hindus; and lastly, Mughls, among whom the affection is very rare. No age is specially exempt; it has been observed as early in life as 19, and as late as 60 years of age. Next to the station itself Rangoonea in the north of the district would appear to yield the largest number of cases; but that is probably owing to the people of that locality having greater facilities of communication with the town, for they can come down the River Kurnafoolia by one tide, and, after visiting the hospital, can return by the next. Among the cases cited is that of a Muhammadan Lascar, aged 36, whose disease (tubercular) began 12 years ago and is not traceable to any hereditary or venereal taint. He states, however, that his wife and children have contracted the disease only recently, and that there are some more cases of leprosy in the village.

CUTTACK.

FROM SURGEON W. D. STEWART, CIVIL SURGEON OF CUTTACK.

The disease does not appear to prevail in Orissa to the same extent that it does in the Upper Provinces. It is confined chiefly to the poorer classes. When it is seen among the well-to-do it is generally due to hereditary transmission; the evidence of transmission is generally very clear. In those cases where the disease originates *de novo*, and no history of heredity is obtainable, the causes are traceable to error of nutrition arising from unwholesome food, such as stale, or salted fish, diseased meat, or to living in particularly low or marshy localities as at Pooree and other places near the sea coast. In such localities there is an increase also of elephantoid disease, which is a periodic fever attended with gradually increasing enlargement gener-

ally of the skin of leg and scrotum. Where this disease prevails, anæsthetic leprosy is commonly seen with more or less of the tubercular variety, etc.

When trying the treatment of gurjun oil, I collected a few cases in the neighborhood of the branch dispensary for the purpose. They attended regularly at first, but had not patience to continue. The disease, however, although the benefit in all was manifest cannot be cured by medicine alone, patients require sufficient and suitable food, and many of them are unable to afford this.

I give a brief outline of eight cases which will shew the history and result of treatment. In six there was hereditary transmission. There is a belief that syphilis occasionally develops the disease, and that the excessive use of mercury tends to the same effect; both would doubtless act in developing the disease if latent, or predisposing it by causing a deteriorated state of the blood and tissues.

A Brahmin has had anæsthetic and tubercular leprosy for past three years; father and mother alive, but have not the disease. On his mother's side, the uncle's son, his sister and her daughter, had the disease. Patient has a son, aged eight, no symptoms of complaint. Treatment, commenced with two drachmes of the gurjun oil emulsion twice a day and inunction once a day. In three months was much benefitted by it.

A woman aged 30. Her father died of the disease at 40. She had an only child that died after its birth. One brother died years ago of some other complaint. There are four sisters. She is the eldest, the two next are at present free from the disease; the third one's daughter has the complaint; the fourth sister is also ill. As before, the oil continued to do good so long as it was taken, the scaly eruption on legs disappeared, the skin of legs became smooth, and swelling of face, nose and hands considerably diminished.

A lad, aged 13, parents and brothers healthy, uncle diseased.

A prisoner, aged 30, father and grandfather diseased. His two wives and children and sister are free from the disease.

ORISSA.

FROM BABU JOGGO MOHUN ROY, ORISSA.

In the generality of the cases, especially among the Hindus, venereal diseases, and perhaps administration of mercury for their cure, have, I believe, been the cause of lepra. At least, in most of the instances that have come under my notice, the leprosy was clearly venereal. My view is further supported by the fact that the malady is to be met with more among people inhabiting and frequenting the towns than those living in the interior of the country, where the usual sources of the venereal diseases do not exist, at least to the extent they do in the towns. That the malady, as a rule, descends from father to children does not, I think, admit of a doubt, for I have seen several instances in which it has done so. I also know of a case in which it has done so. I also know of a case in which the husband has communicated the disease to the wife.

PATNA.

FROM BABOO RAMCHUNDER GOOPTA, PATNA.

Syphilis is another cause of leprosy. As far as my experience is concerned, leprosy is not contagious. I knew a man to have been suffering from tubercular leprosy for a period of twenty years, and all this time his wife was keeping close to him, and still she was quite free from the disease. Moreover, of the male patients at present under my treatment, two are married men and have been living with their wives for a long time, and the wives have not been suffering from leprosy.

BARRH.

FROM ZAHEERUDEEN, ASSISTANT-SURGEON, BARRH.

Leprosy exists, but not to a large extent, in the Barrh sub-division. The nature of the respective places in which the individuals laboring under this malady, and the conditions and circumstances under which they live, does not bear any peculiarity in its form, excepting that the majority of the persons are poor. Very few lepers are seen amongst the higher classes and well-to-do people. Most of the cases who attended the dispensary had previous attacks of syphilis. This disease was no doubt the only cause from which they eventually got the malady in question. In other cases the persons inherited the malady from their parents or forefathers.

MONGHYR.

FROM H. W. HILL, ESQ., M. B., CIVIL SURGEON, MONGHYR.

Leprosy is found mostly amongst the lowest classes of society. I believe it is much more common among the lower orders of Mahomedans than those of the Hindoos. This is due to the difference in habits and the nature of the food. The Hindoo, as a rule, is religiously enjoined to daily ablutions in the Ganges, where practicable, or in some other clean water; he seldom takes fish or meat; while the Masalman is dirty in his habits, does not care to take a bath, and lives mostly upon fish and putrid flesh, such as beef or buffalo's flesh.

In a few instances a hereditary transmission might be traced. I have met with no case in which contagion has been suspected as the cause. I am acquainted with several married lepers, but in none

was the disease transmitted by sexual intercourse. In many instances the disease has been attributed to *syphilitic infection*, and I believe this to be the most fertile cause of the disease in this district. There is no special locality to which it is confined, but it is equally distributed over the districts.

Anæsthetic variety is the most common; in fact nearly three-fourths of the cases belong to this class. Almost every day we meet with patients in the out-door dispensary complaining of patches of anæsthesia in several parts of the body. The color of the affected parts is fainter than the natural hue of the skin. This is known by the common name *sunbahiri* (i. e. anæsthesia). These patches rapidly increase in size, but in some instances they remain stationary for a long time. The tubercular variety is not so common, but in most of these cases both varieties are combined. This is the worst form of the disease.

Gurjan oil, which has been so much used of late years, does not hold out the prospect of bringing about a radical cure of the disease. No doubt, by long continued use, there would be an improvement.

The ulcers heal and the tubercular form disappears under its use. As soon as the oil is stopped all the symptoms reappear as before, no case of perfect cure being yet heard of here.

COOCH BEHAR DIVISION.

FROM DR. W. D. COMINS, ACTING CIVIL SURGEON, COOCH BEHAR DIVISION.

The cause of leprosy may, I think, be hereditary or acquired, and syphilis and scrofula appear to be the diseases which in the parent most frequently lead to the development of leprosy in the child. Notwithstanding Dr. Carter's adverse opinion, the number of cases which have a syphilitic family history afford a very strong presumption that there is a connection between the two diseases.

The people of this country feed principally on rice, vegetables, curries and fish, and, in the cold weather, *dahee* (curded milk) is

occasionally used, but from necessity not from prejudice. Except in the case of the cow, they are not a flesh-eating people. In the south of the State, however, I am informed that the Mahomedans who live near the border eat any cattle that may happen to die from disease or otherwise. This is interesting, for leprosy is much more amongst them in that part than with their neighbors the Hindoos.

The rice which is eaten by the lower classes is of inferior quality, which has been gathered only three or four months, and is therefore highly unwholesome and indigestible, and but little care is taken to remove the whole of the outer husk. How far this is a cause of leprosy I am unable to say. I do not think that much mouldy or decayed rice is eaten, though a case of gangrene of the extremities a few months ago was apparently due to this cause. Dall, on account of its price, is not eaten by the people generally, and cannot therefore be looked upon as a possible cause of disease. I am not able to discover that leprosy is less prevalent amongst the residents on the larger rivers, who drink the pure snow waters of the Himalayas, than with those who obtain their supplies from the nearest jheel.

It appears to be more common in the south than in the north of the State; more often met with on the borders than in the interior: more frequent amongst Mahomedans than Hindoos; amongst men than women and children; and amongst the poor and badly-fed than with the rich and well-to-do.

STATISTICS IN REGARD TO LEPERS.

The following tables are furnished by the Secretary to the Government of India in relation to the number of Leprous persons in British India :

TABLE I.—SHOWING THE NUMBER OF LEPROUS PERSONS, AND THE PROPORTION IN THE THREE PRESIDENCIES, TOGETHER WITH THE TOTAL POPULATION ON WHICH THE RATIOS HAVE BEEN CALCULATED.

	Total Population on which the Leper Ratios have been calculated.	Total Lepers.	Proportion of lepers in every 10,000 (ten thousand) of the population
Bengal Presidency.....	156,201,210*	98,017	6.3
Madras do.	31,170,631	14,525	4.7
Bombay do.	23,395,663	12,382	5.3
Grand Total in British India	210,767,504†	124,924	5.9

* Excluding British Burma, Ajmere and Coorg.

† Including Feudatory States.

TABLE II.—SHOWING THE DISTRIBUTION OF LEPROSY IN BRITISH INDIA.

DIVISIONS.					Total number of Lepers.....	Proportion of Lepers in every 10,000 (per thousand) of the population.....
Bengal and Assam.						
Bengal Proper	Burdwan	....	....	....	14,426	19.5
	Presidency	....	....	....	5,633	6.9
	Rajshahye	....	....	....	7,170	9.3
	Dacca	....	....	....	4,934	5.7
	Chittagong	....	....	....	1,473	4.1
Total					33,636	9.4
Behar	Patna	....	....	....	8,343	5.5
	Bhaugulpore	....	....	....	5,060	6.3
Total					13,403	5.8
Orissa	....	....	....	....	4,661	12.5
Chota Nagpore	....	....	....	....	2,274	5.4
Assam	....	....	....	....	3,314	6.8
Feudatory States	....	....	....	....	2,549	9.0
Total					59,837	8.6

North-Western Provinces.

Meerut	....	....	....	....	1,692	3.3
Rohilkhund	....	....	....	....	2,984	5.8
Agra	....	....	....	....	843	1.7
Jhansi	....	....	....	....	412	4.1
Allahabad	....	....	....	....	2,199	3.8
Benares	....	....	....	....	3,559	3.6
Kumaun with Garhwal	....	....	....	....	1,690	16.2
Feudatory States	....	....	....	....	433	5.8
Total					13,812	4.1

TABLE II.—SHOWING THE DISTRIBUTION OF LEPROSY IN BRITISH INDIA.—*Continued.*

DIVISIONS.					Total Number of Lepers	Proportion of Lepers in every 10,000 (per thousand) of the population
Oudh.						
Lucknow	....	....	....	....	1,419	5.4
Rai Bareilly	....	....	....	....	1,107	4.0
Fyzabad	....	....	....	....	1,032	3.2
Seetapur	....	....	....	....	885	3.2
Total					4,443	3.9
Berar.						
Berar	....	....	....	....	3,748	14.0
Central Provinces.						
Nagpur	....	....	....	....	2,489	8.4
Jubbulpore	....	....	....	....	624	2.8
Narbada	....	....	....	....	930	5.2
Chattisgarh	....	....	....	....	2,400	5.2
Total					6,443	5.6
Punjab.						
Delhi	....	....	....	....	666	3.5
Hissar	....	....	....	....	337	2.6
Umballa	....	....	....	....	819	4.7
Jullundur	....	....	....	....	1,844	7.6
Amritsar	....	....	....	....	1,081	4.0
Lahore	....	....	....	....	338	1.5
Rawal Pindi	....	....	....	....	1,158	4.6
Mooltan	....	....	....	....	215	1.3
Derajat	....	....	....	....	153	1.9
Peshawar	....	....	....	....	269	2.3
Feudatory States	....	....	....	....	2,854	7.4
Total					9,734	4.3
Grand Total in Bengal Presidency					98,017	6.3

TABLE II.—SHOWING THE DISTRIBUTION OF LEPROSY IN BRITISH INDIA.—*Continued.*

MADRAS PRESIDENCY.			Total Number of Lepers	Proportion of Lepers in every 10,000 (ten thousand) of the population
Districts.				
Sea Coast Districts	Ganjam .....	.....	963	5.5
	Vizagapatam .....	.....	856	3.4
	Godavari .....	.....	1,037	5.8
	Kistna .....	.....	626	4.0
	Nellore .....	.....	396	3.2
	Madras City .....	.....	435	10.7
	Chingleput .....	.....	984	10.0
	South Arcot .....	.....	1,208	6.7
	Tanjore .....	.....	1,072	5.0
	Madura .....	.....	812	3.7
	Tinnevely .....	.....	802	4.7
	Malabar .....	.....	1,208	5.1
	South Canara .....	.....	909	9.5
Total			11,308	5.3
Inland Districts.	Kurnool ... ..	.....	246	3.5
	Cuddapah .....	.....	210	1.9
	Bellary .....	.....	356	2.7
	North Arcot .....	.....	1,161	6.4
	Salem .....	.....	363	2.3
	Coimbatore .....	.....	241	1.5
	Nilgiris .....	.....	58	6.4
	Trichinopoly .....	.....	495	4.1
Puducottah Territory			87	2.9
Total			3,217	3.3
Grand Total			14,525	4.7

TABLE II.—SHOWING THE DISTRIBUTION OF LEPERS IN BRITISH INDIA.—*Continued.*

BOMBAY PRESIDENCY.				Total Number of Lepers	Proportion of Lepers in every 10,000 (ten thousand) of the population
Collectorates.					
Deccan.	{	Khandesh	.....	1,748	14.1
		Nasik	.....	593	7.6
		Ahmadnagar	.....	765	10.2
		Poona	.....	1,088	12.1
		Satara	.....	1,179	11.1
		Sholapur	.....	401	6.9
		Belgaum	.....	289	3.3
		Dharwar	.....	162	1.8
		Kaladgi	.....	190	3.0
Total				6,415	8.3
Konkan	{	Kanara	.....	54	1.3
		Ratnagiri	.....	928	9.3
		Kolaba	.....	432	11.3
		Bombay	.....	430	5.6
		Tanna	.....	749	8.2
Total				2,593	7.4
Gujerat.	{	Surat	.....	388	6.2
		Broach	.....	82	2.5
		Kaira	.....	109	2.5
		Panch Mahals	.....	70	2.7
		Ahmedabad	.....	76	.9
Total				810	2.8
Sind....	{	Kurrachee	.....	88	1.8
		Haidarabad	.....	91	1.2
		Thar and Parkar	.....	12	.6
		Shikarpur	.....	69	.8
		Uper Sind Frontier	.....	17	1.4
Total				277	1.1
Feudatory States				2,287	3.3
Grand Total				12,382	5.3

THE LEPER HOSPITALS OF INDIA.

According to the report of the Secretary to the Government of India sixteen separate lepers' asylums exist in India, of these five are maintained partly by public funds and partly by private charity:—Umballa and Kangra, in the Punjab; Calcutta in the Lower Provinces of Bengal and Almorah and Dehra Dun in the North-western Provinces. Nine are entirely maintained by public funds:—Jullundur, Amritsar, Sialkot and Rawalpindi, in the Punjab; Ratnagiri in the Bombay Presidency; Madras, Trichinopoly, Palliport and Agra in the North-western Provinces. The remaining two, Subathu in the Punjab and Bhandara, in the Central Provinces, are wholly supported by private charity.

Lepers are also treated in many places in separate wards of other institutions such as general hospitals and poor-houses. In the district of Bancoora, in the Lower Provinces of Bengal, where the disease is specially prevalent, the lepers in the jail are kept apart in a special ward.

The structural and sanitary conditions of a few of these asylums, and the arrangements made for the medical and hygienic treatment of the sick in them are given, as extracted from the reports of medical officers in charge.

LEPER HOSPITAL, MADRAS.

This hospital is wholly supported by Government. In 1884, four hundred and three patients were treated, of whom 52 died. One hundred and forty-five were "Relieved," with the "Remark," "disease incurable," and 206 remained on hand.

The hospital consists of several blocks of buildings erected on an extensive piece of ground with a railed enclosure. A portion of this ground has separate accommodation for females. One large

block consisting of three wards, joined to each other by a covered way, is for European and Eurasian male patients. Each ward contains eight beds, and has a bath-room attached; and two latrines are placed, at a convenient distance, for these patients. There are five separate wards for native patients; each accommodating 16 beds; and a block, divided into 6 wards, with beds for 30 patients. One of the former is used for the treatment of patients suffering from intercurrent diseases. All these patients have two separate bath-rooms and 4 latrines for their use. Besides the above, there are other buildings for the steward's office, and surgery, and there are three godowns, one used by the hospital contractor for stores, one for medicines, and the third as a lumber-room. The kitchen is divided into two cook-rooms; one for Europeans and one for natives. There is also a dead-room separated from the rest of the hospital buildings. In the female enclosure there are two large buildings; each is divided into two wards. In the European wards there are 16 beds, and in the native 24. Each building has a bath-room attached and a latrine placed at convenient distance. The hospital is supplied with water from the Red Hill Lake by taps placed in the bath-rooms, kitchen and gardens. A portion of the hospital compound is allotted to patients for cultivating country vegetables. Patients are visited by their friends between the hours of 10 A. M. and noon, and from 4 to 6 P. M.

Treatment.—All patients, not suffering from intercurrent diseases, are treated by the daily application of chaulmoogra oil, mixed with cocoanut oil, in the proportion of 1 of chaulmoogra oil to 12 parts of cocoanut oil, and this is carried out as follows:—

The European patients assemble in one of the verandahs at 7 A. M., and continue rubbing the oil into their bodies until 9 A. M., after which they take a bath. The natives begin the rubbing at 9 A. M., and continue it till 11 o'clock and then have their bath. All patients suffering from sores meet in a verandah set apart for the purpose at 7 A. M. and 2 P. M., and have their ulcers dressed. Rice flour poultice is the chief emollient application, but special dressings are as carbolic oil, iodo form, camphor turpentine, sulphate of copper, &c., used in the form of ointment or lotion. Patients are required to keep their own wards, and the hospital compound clean. Some well-behaved men are appointed captains of wards, whose duty is to ensure order and cleanliness among the patients, and, when required, the more healthy patients are employed as orderlies, who superin-

tend the cooking and look after bed-ridden patients. The night soil is removed from the latrines and deposited in a night-soil-cart, and removed by contract agreement at a cost of Rs 25 a month, whilst the surface drainage is accomplished by small drains leading into a main, which communicates with one of the town sewers.

The establishment of the hospital is as follows:—

1 Assistant Apothecary, 1 Steward and Writer, 1 Surgery Cooly, 2 Peons, 2 Dhobies, 1 Tailor, 3 Cooks, 1 Dressing Cooly, 2 Male Ward Coolies, 2 Watermen, 1 Gardener, 2 Female Ward Coolies, 3 Male Toties, and 2 Female Toties. A barber is engaged to shave the patients twice a month and is paid, according to the number that he shaves, from the contingencies.

The hospital has a small library of books and periodicals contributed by the public. A small gymnasium has also been provided for patients who are able and like to take this exercise.

D. R. THOMPSON, M. D.,
Surgeon, 1st District, in Charge Leper Hospital.

LEPER HOSPITAL, TRICHINOPOLY.

The old Leper Hospital is an old District Jail, situated in the centre of the town. There is more than sufficient accommodation for the number of in-door patients treated which is limited by the Municipality to 15. The building consists of two long blocks, each composed of 8 single wards for single patients, and 2 larger wards. I consider the hospital is capable of holding 40 with comfort were funds available. The sanitary condition is all that could be desired. Every part of the building being frequently white-washed and tarred. The conservancy arrangements are most carefully attended to, and the dry earth system fully carried out. Everything is removed daily by the Municipal carts. There is a well of excellent water within the enclosure. A hospital assistant is specially set apart for this work, whose salary is paid in part by the Municipality and the remainder by the Government. The medicines required are supplied from the Municipal Hospital. The patients bathe daily, and clean clothing is provided for them. I find that the so-called

unserviceable clothing from the Municipal Hospital answers admirably for this purpose.

L. C. CANNEY, Surgeon Major,
District Medical and Sanitary Officer.

This Leper Hospital is entirely supported from public funds by the Municipality. The number of lepers treated here, were in 1883, 89; in 1884, 127; relieved in 1883, 60; and in 1884, 87; died 8 in each year and leaving 16 on hand.

PALLIPORT LAZARETTO.

The structural and sanitary condition of the hospital is satisfactory. The buildings provided for the lepers are built of laterite, are tiled, and having been occupied since 1728 may be said to be old. They are kept in good repair, an estimate being framed annually and submitted for the sanction of the Surgeon-General before any work is undertaken. Of wards in the ordinary sense there are none, but the lepers live in rooms.

There are three blocks, one divided into 7 rooms, the third into 8, and the 2nd of about double; the dimensions of the former being a double block containing 15 rooms; of these one block is for females and two for males. The average dimensions of the rooms are 13 feet in length, 12 feet in breadth and 10 feet in height. The total number of rooms used by patients is 24. The maximum number of patients accommodated in one room is 2, and the minimum is 1. Besides these rooms, the blocks contain 2 kitchens, 2 chapels, one fumigating and one store-room. At the entrance to the Lazaretto from the backwater there are two rooms facing each other, one serving as a surgery and the other as a store-room. There are separate latrines for males and females, two bathing sheds, three wells, a tank, and quarters for the hospital assistant. No provision for drainage. The Lazaretto has a dwarf wall surrounding it, on which there are wooden railings, which require renewal from time to time.

Medicines are issued daily to the patients by the resident hospital assistant, who is also responsible for the discipline of the establishment; that the diets are supplied according to contract, that the medicines are regularly used, and that the patients take the baths, &c., as they are directed. Some of the inmates do a little gardening, but their existence is monotonous and but for the shelter, food and clothing they obtain in the asylum, their lot would be miserable.

The Pallipott Lazaretto is entirely supported by public funds (Government). In 1883, forty-five lepers were treated, and in 1884 thirty-seven, three dying in the former and two in the latter year. The Medical Officer adds: "Disease incurable. Temporary improvement whether treated by gurjun, or chaulmoogra oil, or by carbolic acid gas fumigation."

There are usually thirty-four lepers under treatment, the diet of each costs $2\frac{1}{2}$ annas a day, and they are supplied half-yearly with a mat and two yards of cloth each. Should any balance remain at the end of the financial year from the Budget allotment, two yards of blue cloth are given to each inmate.

W. H. MORGAN, Brigade Surgeon,
Civil Surgeon, Cochin.

RATNAGIRI HOSPITAL.

Lepers only are received at this hospital which is conducted much the same as a dispensary. There is a committee of which the Collector is president. Civil Surgeon has the interior control under supervision of Medical Department. Annual allowance from Government of Rs 2,000 (\$1,000). From local funds Rs 2,500. The first only available after grant from local funds is exhausted, and limited to maintenance repairs by Public Works Department at Government cost.

There are three large double wards in separate blocks—verandahs all round—built of laterite—space for 100 beds affording 800 cubic feet space each. One ward occupied by females. Wall running

across enclosure separates male and female wards. Four double cook-rooms and four latrines. Night soil removed as the site is rock for a long distance round, no trench possible. Bathing defective, one of the cook-rooms being used for bath-room. Well on premises, clothing and rations sufficient, hospital two miles from station, visited twice or thrice weekly by Civil Surgeon or when called. Resident Medical Subordinate.

SASSOON INFIRM ASYLUM, POONA.

This Asylum is for the poor and infirm of all kinds, and is conducted by a committee, the Collector of Poona being president. Two secretaries. The Municipality gives Rs 100 per mensem. A fund of Rs 51,200 invested. Donations also made towards its support. It is situated to the west of Poona in a spacious walled compound. There are eleven separate barracks capable of accommodating eight persons each, and fairly ventilated. Also office and dispensary very poorly supplied with medicines; cook-rooms and latrines. A native medical practitioner is paid Rs 10 for visiting twice or thrice a week. They do not profess to treat the lepers medically. The number of lepers in 1883-84 were 333, of whom 277 were males. In July, 1885, there were 80 inmates, of whom 36 were lepers. As a rule about half the number are lepers but no systematic records are kept.

SIR JAMSETJI JEEJEEBHOY DARMSHĀLA, BOMBAY.

This asylum is for the poor and infirm of all kinds and is conducted by a committee of the "District Benevolent Society of Bombay." It is supported by a grant of Rs 300 monthly interest on Endowment Fund of Rs 10,700. Donations (in 1884) Rs 991. The number of lepers in 1883 is reported as 116 and in 1884 as 138.

They receive no medical treatment. There are eight long blocks of buildings substantially built and said to be well ventilated. Conservancy cared for by Municipality on a payment of Rs 144 per annum. When I visited this asylum some time ago I considered the place cramped and crowded. No medical treatment is carried out. When inmates are very ill they are sent to the Bombay Hospitals.

JAMSETJI JEEJEEBHOY HOSPITAL, BOMBAY.

At this hospital all kinds of patients are received but lepers only in leper ward. It is under the management of the authorities of the Hospital and Medical Department. The ward where lepers are received is called the incurable ward. It is a handsome detached building, well ventilated, and paved with encaustic tiles and preserved in the same sanitary condition as the rest of the Hospital ward in charge of an Assistant Surgeon under supervision of First Physician. Patients capable are encouraged to work in hospital grounds. In 1883 there were 114 lepers reported of whom 29 were relieved, 19 died and 44 remained. In 1884 there were the same number, 20 were relieved, 16 died and 38 remained.

SÁVANTVÁDI.

Lepers only are received in the leper ward and the hospital is conducted by the Darbár and Political Agent. The cost is borne by Native State; but lepers are expected to provide their own diet when able to do so. Expenditure included in that of Civil Hospital. It is situated on an elevated and well drained site half-a-mile from Civil Hospital. Three wards containing four beds each. Well ventilated. Food, clothing, water-supply, satisfactory. Out-houses of cook-room and latrine. Visited every day by Hospital Assistant, and twice a week by Civil Surgeon. In 1883 there were 5 lepers admitted, and in 1884 there were 10, two of whom were relieved and 5 absented themselves.

AHMEDABAD.

This hospital is controlled by the Municipality. Lepers only are received in leper ward, but cholera and small-pox in adjoining wards. The Municipality defray the cost of establishment Rs 52 per mensem. Provisions, clothing, contingent charges, are included in general accounts of Civil Hospital. It was originally a rest-house for travellers, situate in an open walled enclosure 140 by 152 yards; and 80 yards from one of the city gates. There are three blocks in different parts of enclosure with a well in the centre. The largest block is used for lepers; the other two for cholera and small-pox. Pensioned Hospital Assistant in charge. Visited frequently by Civil Surgeon. In 1883 there were 60 lepers of whom 47 were relieved, one died and 12 remained. In 1884, there were 62, of whom 1 died, 26 were relieved and 31 remained.

CALCUTTA LEPER ASYLUM.

The Calcutta Leper Asylum is situated on a spot of ground in Amherst Street, and is divided into male and female parts (by a wall intervening). In the female part there are two wards, with a latrine, cook-house and bath-room attached. The male part consists of three wards, with a latrine, cook-house and bath-room, and also a small garden. The wards of the asylum are built on a raised platform, with verandahs all round, and outside the wards there is a pucca drain for washing away all refuse matter. The wards are white-washed twice during the year, and are coated with coal-tar twice a year, to the height of four feet from the floor. The wards are washed twice a month and also disinfected, the same being done to the drains and latrines daily; and when a leper dies, his clothes, bedding, blankets, &c., are burnt.

On the 15th October, of each year, European medicines are

indented from the Calcutta Government Medical Depot, and these are supplemented by monthly grants from the District Charitable Society of Calcutta, for the purchase of oils and indigenous drugs. There is a medical officer attached to the asylum, who visits daily, and also a Resident Apothecary. There are also two dressers attached, with three sweepers, three cooks (Hindu, Mahomedan and Christian), and one durwan.

Each leper has a good iron cot and a mattress, and each year they are supplied with two dhoties and one warm blanket, and their clothing is always replaced when burnt. The clothing of the lepers is washed weekly by a phobee who is on the establishment.

The number of lepers treated in this asylum during 1883 amounted to 178, and the number of deaths to 22; of these deaths, 16 were amongst new cases admitted during the year, the remainder being old cases. During the year 1884, there was an increase in the number of lepers treated, viz., 200 treated. The number of deaths amounted to 26; of these deaths, no fewer than 20 were amongst new admissions, and only 6 amongst the old cases. This is rather satisfactory, as during the year, owing to overcrowding in the wards, there was an epidemic of erysipelas, which, I am glad to say, was soon checked by taking proper sanitary measures, as well as by the segregation of the lepers, but unfortunately six of the lepers fell victims to the disease.

At present the wards of the asylum are overcrowded, many lepers being refused admission for want of accommodation. Each leper on an average has a very diminished supply of cubic feet of air to breathe, instead of 1,500 cubic feet as allowed on the best hygienic principles. For instance, in the Hindu ward, which is by length 70 feet, breadth 18 feet, height 14 feet, and containing at present 28 inmates, it will be seen that only 630 feet of air is the allowance for each inmate, which is less than half the quantity which ought to be allowed. This is a very serious drawback and entails consequences which may be very deplorable in an outbreak of epidemic disease.

The former diet of the lepers at this asylum was poor and meagre. In June, 1884, new scales of diet were sanctioned, which are now on an equal footing to the diet of different native hospitals of Calcutta. The new diet has greatly improved the condition of the lepers. They have gained in flesh; they do not suffer so much now from foul sores; and it has reduced the mortality to a certain extent, as since its introduction up to the close of the year one only died from

the old patients, and six from the new cases, who were bought into the asylum in a moribund condition.

With the exception of a subscription of Rs 100 a month from the corporation of Calcutta, and an annual grant of European medicines from the Government Medical Store, the institution has been supported entirely by the District Charitable Society, and was a heavy charge on its "General Fund." But about two years ago, two legacies and a donation from Mr. Greece Dutt were made over to the Society for the purpose of forming a "Leper Asylum Fund," and this capital, amounting to Rs 34,900, is now invested in Government securities. The average monthly cost of the asylum is Rs 600, exclusive of municipal taxes and repairs.

BANKOORA JAIL, BENGAL.

The leper ward is a building consisting of three rooms, situated in a spacious and airy yard and separated from the rest of the jail. Conservancy is carried on upon the system of receiving excreta in pulverized dry earth, covering them with it, and removing them to a distance for burial. Water is supplied from wells in the jail, which require deepening, and is filtered. Clothing and food are supplied as to other prisoners, with such variations as the medical officer may think necessary. The present superintendent of the jail is a native Assistant Surgeon, who has a Civil Hospital Assistant under his orders. They treat the lepers as they would any other sick in the jail. I consider the jail at Bankoora the most healthy in the province.

The superintendent supplements the above report of Officiating Inspector-General of jails, E. V. Westmacott, Esq., by stating that the leper ward consists of two rooms with an ante-room. Of the two wards, one is larger than the other, the former measuring 648 cubic feet and accommodating 20 prisoners, the smaller measuring 500 cubic feet and accommodating 18. The ante-room is a small one, occasionally used for the isolation of bad lepers, where they are treated separately from the rest. The number of lepers treated in 1883 was 30, with one death, and in 1884 was 36, with only one

death. Of the rest, some are still in jail; the others were discharged on expiry of their sentence. They are all criminals. Every possible attention is paid to the hygienic condition of the lepers confined in this jail. The wards are large and rooms well ventilated, with opposite doors and windows, admitting air and light in more than sufficient quantity; situated in the midst of a large compound having perfect southern exposure, and separated from the main ward of the jail. The state of the conservancy and removal of the night soil is all that could be desired, and is done according to jail regulations. For purposes of cleanliness, bathing and washing they get sufficient water from a well situated in their compound, and get enough of wholesome filtered water for drinking purposes. They get their food according to scale No. 1 for laboring prisoners, with such varieties and extras best suited for their condition. They pass their days in the open air, being engaged in some light labor, chiefly hewing of grass and husking *nim* seeds, &c. They are well-clothed. By these comforts and attentions their condition after admission becomes considerably improved, and they go out in a better state of health than they came in. Outside the jail nothing can be more miserable than the state in which they live. Suffering from privations of all sorts, without any proper shelter to protect them from the inclemencies of the weather, without proper clothing, living as they generally do on begging, they scarcely get a full meal in their life; they readily succumb to the ravages of the disease.

ALMORA LEPER ASYLUM.

In the North-western Provinces there are only three Leper Asylums—that is to say, institutions devoted solely and entirely to the maintenance of lepers: these are the Almora, Dehra Dūn, and Agra Leper Asylums. But besides these institutions, lepers are received into 22 poor-houses, situated at the headquarters of as many districts, along with blind and destitute poor.

The Leper Asylum at Almora is supported partly by the interest which accrues from a funded capital of Rs 30,000 and partly from private subscriptions. The chief portion of the capital fund was,

I believe, made over to the trustees of the asylum by the Government of the North-western Provinces many years ago, in the shape of a balance of a stock of tea left in the hands of Government, when it withdrew from the tea industry in Kumaun. During the past year (Report dated June, 1885), the income of the Almora Asylum was Rs 6,388, the principal sources being private subscriptions Rs 3,085, and interest on capital Rs 2,145. It may thus be said that of the income, exclusive of Rs 949 cash balance, the Government contributed 41 per cent., the Municipality 2 per cent., and private subscribers 57 per cent.

At Almora the lepers are housed in ranges of cottages built on a gently sloping hill side, the females being separated from the males by a low divisional wall. There is a small dispensary in charge of a locally-entertained Native Doctor—a store-room and grain go-down, and a small chapel, the institution being under the immediate supervision of the resident missionary of the London Independents. The whole of the asylum is surrounded by a low wall, and the grounds are planted with trees. In 1883, 137 were “benefitted” leaving 127 on hand, and in 1884, 130 were benefitted, leaving 107 on hand.

THE DEHRA DÚN LEPER ASYLUM.

This asylum was until last year supported entirely by private contributions. The late Mr. Wilson, of Mussooree, contributed a sum of Rs 20,000 to form the nucleus of a trust fund, and this has been added to until it now amounts to close on Rs 25,000. Since last year, the Government of the North-western Provinces and Oudh has made an annual grant of Rs 1,500 towards the support of the asylum; so that, taking the income of the past year as an index to its resources, the Dehra Dún Leper Asylum receives from private subscriptions, 27 per cent.; from interest on securities, 27 per cent.; from the Municipalities of Mussooree and Dehra, 17 per cent. and from the Government, 29 per cent.

The asylum is divided into a male and female side, each consisting of an enclosure surrounded by a wall, and having lean-to sheds erected against the walls as dwellings for the lepers.

The Hospital Assistant, attached to the jail and police, prescribes for the sick of the asylum, and for the purpose visits it daily, the whole being under the supervision of the Civil Surgeon. In 1883, the number of lepers benefitted was 92, leaving 51 on hand, and in 1884, 71 were benefitted, and 53 left on hand.

THE AGRA LEPER ASYLUM.

This asylum is supported entirely by the Municipality, and is situated in an old garden enclosure on the banks of the Jumna, the house for the lepers being lean-to erections against the outer enclosure walls. The Hospital Assistant of the Chhatta charitable dispensary visits and prescribes for the sick. In 1883, twenty-three lepers were benefitted, leaving a like number on hand, and 1884, thirty-three were benefitted, leaving 24 on hand on December 31st.

POOR-HOUSES AND ASYLUMS.

In the Poor-houses, which receive lepers as well as blind and helpless poor, the lepers are supported by the funds raised for the general purposes of the charity. Of the Poor-houses in which lepers are also received, it may be said that they all have the services of the Hospital Assistants whose sphere of work is nearest to them, and there is generally a clerk or daroga in charge of the accounts. I must repeat, however, that no special medical or hygienic treatment is now attempted for the cure of lepers, although they receive when sick, the same attention as the other inmates of the Poor-houses.

These Poor-houses are located at Allahabad, Bareilly, Benares, Bahraich, Bara Banki, Banda, Cawnpore, Farukhabad, Fyzabad, Gházipur, Gonda, Hardroi, Kheri, Lucknow, Meerut, Moradabad, Muttra, Orai (Jalaun), Rae Bareli, Saháranpur, Sháhjahánpur, Sitapur and Sultánpur. At these places there were benefitted in 1883, 465 men, 200 women and 35 children, leaving 148 men, 47 women and 4 children on hand. In 1884, there were benefitted 457 men, 151 women and 42 children, leaving 151 men, 55 women and 7 children on hand on December 31st.

UMBALLA ASYLUM.

There are seven Leper Asylums in the Punjab Province, namely, Umballa, Kangra, Jullundur, Amritsar, Sialkot, Rawalpindi and Simla.

This asylum is near the Umballa City. It is an American Mission Institution, and is under the sole control of the missionaries. It is supported partly by Municipal and District Funds, and partly by private subscriptions. Of the total income of Rs 2,052 for 1884, including a balance of Rs 351 from the previous year, Municipal and District Funds contributed Rs 1,100 or more than a half.

The asylum consists of a block of 5 buildings, viz., 3 low-built Kutcha barracks, a "Prayer-room," and a building containing a room for the compounder and chaukidar. The barracks are about 70 feet long by 16 broad, divided into 23 rooms of about 12 feet by 10 each, with a 6 feet wide verandah. The "Prayer-room" is 30 feet by 18, and here the lepers assemble for religious instructions by the missionaries. Dr. Bateson, Civil Surgeon, thinks there is a great want of ventilation in the barracks. There is no latrine; but as the asylum is in an unfrequented place near sand-hills, the Civil Surgeon thinks one hardly necessary. The Civil Surgeon visits the asylum once a week, or oftener if necessary. No specific treatment is now adopted. Such medicines as are required are supplied gratis from the City Dispensary. The number of lepers treated during the years 1883 and 1884, were as follows: 1883, 40; 1884, 48; of these, 2 died in 1883, and 12 in 1884, leaving 35 remaining.

THE KANGRA ASYLUM.

This asylum is situated in a beautiful spot in the centre of a tea garden, about a mile from the Dharmasala Jail, and at an elevation of over 4,000 feet above the sea. It is supported by District and

Provincial Funds, and by the interest of Rs 5,800 which have been gradually invested in Government 4 per cent. promissory notes. The foundation of this Endowment Fund was a sum of Rs 1,500, which was given by Colonel Lake, formerly Commissioner of the Division, and it has gradually been increased by donations and subscriptions, chiefly from the visitors of Dharmsala and the residents of the Kangra Valley, both European and native, which have been collected by successive District Officers of Kangra. The expenditure last year was Rs 857. During 1884, 21 lepers were treated, 2 dying, 1 leaving and 18 remaining.

The asylum buildings consist of two parallel rows of barracks, built of stone and roofed with rough slates. They face each other and are separated by a bit of garden ground. One room of barracks is occupied by males and the other by females. The huts are kept fairly clean, but there is a want of ventilation in them. Their situation, however, on a pine covered ridge, at an altitude of 4,000 feet or more above the sea, renders free ventilation not so necessary or desirable as in the plains. On the whole, the lepers here seem as comfortably situated as their miserable condition will admit of. A spring in the neighborhood supplies them with plenty of good drinking-water.

A hakmi, who also knows European medicine, is employed to superintend the asylum and to minister to the lepers' ailments; but no special method of treatment has been tried for some years. The Civil Surgeon of Dharmsala visits the asylum at times.

THE JULLUNDUR ASYLUM

Is at a place called Dakni Sarai, about 5 miles from the town of Nakodar. It is supported by "malba" or village funds, collected with the land revenue. The cost of maintenance of the lepers belonging to other districts is recovered from the districts concerned, the cost of maintenance of each leper being calculated at Rs 5 per mensem. The number treated in 1883 was 69, of whom 4 died, 20 left and 45 remained at the end of the year. In 1884, 89 were treated, 6 dying, 21 leaving of their own accord and 62

remaining at the end of the year. The mortality for the two years has been 6.32 per cent. of the total treated. The building in which the lepers are accommodated is an old Badshahi Sarai, which is large enough to hold 200 if required. It is on the banks of the Eastern Beyn, and is favorably situated for drainage. A compounder on Rs 12 a month is employed to look after the lepers, and under him there are a chaprassi, a bhisti, and two sweepers. The place is kept clean, and the dry earth system is carried out. No special treatment is adopted. The Civil Surgeon frequently inspects the asylum.

THE AMRITSAR ASYLUM

Which is the largest and best provided in the Province, is situated about a mile from the town of Tarn Taran, 12 miles south of Amritsar. It is supported by Amritsar Municipal Funds, which pay all expenses; and at the close of the year, the amount is recovered from the districts to which the lepers belong. In 1883, 349 lepers were treated here, 23 died, 100 left of their own accord and 226 remained over; in 1884, 305 were treated, 33 died, 40 left of their own accord and 232 remained at the end of the year. The mortality was 8.56 per cent. of the total treated.

The leper settlement or colony at Tarn Taran consists of three lines of huts running parallel, but without plan or order, of all sizes and shapes, with kutcha walls and roofs. There is no enclosing wall, so that the lepers are at liberty to roam about as they please, and to picket their cattle in the open near their houses. There are about 140 huts, some having small enclosures. During the past 15 years, much has been done to increase the accommodation, baths have been appended to the wells, latrine accommodation has been built, and a house for the Hospital Assistant and a large garden have been provided. So far as isolation of the leper goes, there is no provision whatever, because he is constantly absconding or obtaining leave. Nor can the present arrangement be considered in any sense as a hospital. It is impossible for the Civil Surgeon to supervise it. There have been spasmodic attempts made at different

times in regard to the treatment of the disease, viz., the use of garjan oil, and sweet oil and nerve stretching. The sexes mingle, and the rising generation of lepers may be seen running about in the colony. The huts are, as a rule, filthily dirty and untidy, and the general aspect of Tarn Taran Leper Asylum depressing to a degree. The sick and urgent cases are provided with medical treatment, there being both a Hospital Assistant and a dresser resident, with a well-stocked dispensary ready for emergencies. Rs 3 per month are given to each adult, and Rs 1—8 to each child, from the Municipality of Amritsar. A liberal supply of blankets is furnished in the cold weather, and there is a staff of bhisties and mehters. The Rev. Mr. Guildford, who lives at Tarn Taran, now takes considerable interest in the lepers.

THE SIALKOT ASYLUM

Is situated at a place called Baba Lakhan, about 8 miles from the town of Sialkot. It is maintained entirely from District Funds. In 1883, 49 lepers were treated, of whom 2 died, 6 left of their own accord and 41 remained; in 1884, 46 were treated, 7 died, 2 left of their own accord and 37 remained at the end of the year. The mortality for the past two years has been 9.47 per cent. of the total treated. The asylum building consists of three double barracks of pucca brick, with accommodation for 72 lepers. It is well situated, and the sanitary conditions are satisfactory. There are two good wells and a garden attached to it. The establishment consists of a compounder, cook, kahar and sweeper.

THE RAWALPINDI ASYLUM

Is situated in a pleasantly wooded place, about half-a-mile to the north-east of the city. It is supported by District and Municipal Funds. The total amount expended during the year 1884, was Rs 1,904-6-11, of which District Funds contributed Rs 686-3-5 and Municipal Funds, Rs 1,218-3-6. In 1883, 49 lepers were treated,

2 died, 6 left and 36 remained at the end of the year; in 1884, 45 were treated, 2 died and 39 remained at the end of the year.

The buildings consist of eight separate barracks, one of which contains 8 rooms, five contain four rooms each, and two (which are in a ruinous state) have 2 rooms each. The large barrack containing 8 rooms is in good repairs, having been built only a year ago. It has two roomy verandahs, one on each side, and the apartments are comfortable and fairly ventilated. One of the barracks containing four rooms being occupied by the servants of the asylum, there remains accommodation for only 24 patients, while the number now in the asylum is 49.

Rs 1,200 has been budgetted for to build a new block capable of holding 8 lepers; but as yet no arrangements have been made to carry out the work. The latrine arrangements are now reported to be good, there being a separate latrine for males and females, each supplied with iron utensils and the dry earth systems adopted. The drinking-water is got from a pucca masonry well, and is much esteemed by the people of the town, who largely resort to it for their domestic supply. The Assistant Surgeon in charge of the Civil Dispensary affords medical aid when required, but there is no attempt at any special treatment. An establishment is kept up consisting of a dresser, a cook, a kahar, a chaprassi, a bhisti, and a sweeper.

THE SABATHU ASYLUM

Is another institution which is entirely under the management of the American Presbyterian Missionaries. It is supported by private funds collected in India, Great Britain and the United States of America. The total income for the past two years has been Rs 6,752 and Rs 6,842, and the expenditures Rs 2,284 and Rs 2,834.

The lepers receive a monthly allowance in cash of Rs 3 to Rs 3-8 each, from which they supply themselves with food, clothing and fuel; but warm clothing and blankets are given to them extra during the winter. From the fact, as shown by the accounts, that considerable sums are found on the lepers after death, it would appear that

the allowance given is ample for their wants. In 1883, 112 were treated, of whom 13 died, and in 1884, 104, of whom 10 died. The asylum is situated not far from the American Mission House at Sabathu on a breezy, sunny ridge. The houses consist of a series of barracks arranged in a row along the ridge and divided into compartments large enough to lodge two lepers in each. They are said to be well ventilated, and have a verandah in front. The sexes are strictly kept apart in different barracks, and they have patches of garden ground which they cultivate themselves when able to do so. Latrines are erected at convenient distances, and are attended to by a sweeper. Bhisties are employed to bring water to the lepers.

Dr. Newton, American Missionary, who was for many years in charge of the asylum, and who took the keenest interest in lepers, died in 1880, and the Rev. A. Rudolph is now in charge, assisted by a native Christian compounder, who attends to the ailments of the lepers. All attempt at specific treatment has been abandoned for some years as useless. During 1883-4, 1,346 lepers have been treated in the asylums of this Province (Punjab) of whom 118 have died, giving a mortality for the two years of 8.76 per cent. The highest mortality has occurred in the Umballa Asylum, 18.9 per cent., and the lowest 4.25 per cent. in the Rawalpindi Asylum.

TREATMENT OF LEPROSY IN INDIA.

EXTRACTS FROM REPORT ON CASES OF LEPROSY TREATED BY SURGEON
C. T. PETERS, AT BELGAUM, DATED BOMBAY, JUNE, 1879.

The people were very sceptical as to their ever being cured, or even relieved, of such a dreadful malady as leprosy, for which they have been cast out by friends and society, and made dependent on charity for their daily bread. One of them, however, a Goanese, in whom the disease had only existed for a couple of years, was selected for treatment. He was made to attend at the Civil Hospital daily, where he had a bath at about 9 A. M., with soap and warm water, which was followed by an inunction of carbolic oil (in 20

parts), and the open sores dressed with a somewhat stronger carbolic oil (in 10 parts). Internally, he was treated with chalmogra oil (five minim doses), and occasionally iodide of potassium. After having assiduously taken these remedies for about six months, he fully recovered the sensibility in the extremities, the sores healed, and in every other respect he felt so well that he left the asylum to join his relatives in Goa with a feeling of deep gratitude. (An appended note states: "Six years later (in 1877) this man returned to the asylum with aggravated symptoms of leprosy, said to have recurred since the famine set in.") The others in the asylum had not so much confidence, and it was very difficult to get them to attend regularly.

On my being transferred to Poona in 1873, I undertook the charge of a leper, whom I commenced to treat in the same way. He was improving slowly, when details of the treatment by Dr. Dougall with gurma oil reached me. I at once tried the application of the balsam unmixed with any other ingredients, with the happy result of closing the deep ulcers which had been festering for months; but as I had to leave the station soon, I lost sight of the patient.

On my return to Belgaum, I gladly accepted the offer of Reverend G. T. Bridges, S. J., the Roman Catholic Chaplain, to treat the lepers now under his charge, and they have been under my charge from July, 1876, to November, 1878.

Twenty-nine cases were treated, 18 males, 11 females, of these these, three were children under 14 or 15 years, two females and one male; four were under 25 years, one female, three males; and the rest above 25 and under 45 years of age. Of the total number of cases treated, including those from the outside, two were Brahmins and one Jain, who were in good circumstances of life, two of them being Karkoons, and one a grain merchant, one Mussalman, and the rest Hindus of the lower classes. In many of them there was leprosy in the family, such as father and son were leprosy, and brother and sister in another instance. A few of the patients attributed it to marriage with leprous subjects; whilst in a few either there appeared to be a reluctance to acknowledge that the disease was hereditary, or that no cause could be assigned; the disease appearing *de novo* after a general failure in health, or accidental injury to the hands or feet while cutting something, or walking along a rough gravelly ground, and the wound thus caused becoming the seat of the disease. Several patients suffered from both the tuber-

cular and anæsthetic forms at the same time. In some it was associated with syphilis. The disease, as is generally attributed, was not traceable to the consumption of fish; fish being not so easily procurable in Belgaum; while in the three high caste Hindu patients it was quite out of the question, as they never eat fish. No particular kind of diet, in fact, can be said to give rise to this disease.

The patients, generally, complained of dyspepsia, attended with a burning sensation in the procardial region, voracious or capricious appetite which is not easily satisfied, and want of sleep at night, (Note. "These prominent symptoms are not generally described in books,") besides general malaise pains and ache in the joints and different parts of the body, resembling chronic rheumatism, attended with feverishness, and among those who were very much debilitated, diarrhœa and dysentery prevailed. In some advanced cases lung complications, attended with high fever, were present; probably due to tubercules (leprous) forming in the lung tissue, and terminating fatally. In one case an attack of high fever was followed by the permanent development of brownish-black spots all over the trunk as far as the waist. One patient who had ulceration of the throat, and whose voice was reduced to a whisper, suffered frequently from fits resembling spasmodic croup, which yielded to the administration of iodide of potassium in combination with ether and ammonia. The amount of anæsthesia present in the fingers and toes rendered them liable to be burned with fire while cooking, or they were known by rats at night, without their owners being aware of it at the time.

My plan of treatment has been, first to make the patients rub carbolic acid and sweet oil, (1 in 40) early in the morning for a couple of hours all over the body, and then bathe at about 9 o'clock with soap and warm water. Afterwards to rub an emulsion of gurgjun oil (made according to Dr. Dougall's formula, viz., gurgjun oil one part, lime water three parts, churned, so as to form a thin ointment of a creamy consistence) over the affected parts, and fill in the ulcerations with the cotton wool smeared with the emulsion. The ulcers healed rapidly, but the anæsthetic parts and tubercules remained much the same; and except in one or two instances, where it was alleged by the patients that the tubercules were softening, I noticed no change in them.

This induced me to try the cashew nut oil which has been so successful in the hands of Dr. Beauperthy.

The result of my trial was so far satisfactory that some of the

oldest patients, who had no hope of being ever relieved in the slightest degree, took to it hardily, in spite of the pain and discomfort arising from the blisters which the application of this oil over extensive surfaces gave rise to; and on seeing that they were benefitted they sent for their friends, not in the asylum, and placed them under treatment.

Briefly, then, I have used *externally*,—

(1) as a general application, *carbolic oil* (1 in 40) rubbed over the whole body to promote healthy action of the skin, followed by soap and warm water ablution;

(2) for the ulcerated parts, an emulsion of *gurjun oil* and *lime water* (1 in 3) applied by means of cotton wool and bandage, as well as by friction;

(3) for the anæsthetic parts and tubercular growths the application of *cashewnut oil*.

Internally—*chalmogra* oil in five minim doses in combination with bi-carbonate of soda, five grains, and peppermint water, one ounce, and, in particular cases, iodide of potassium in three grain doses.

I shall now briefly consider the remedies used:—

1.—*Gurjun Oil*. I used this for a time, both internally and externally, as recommended by Dr. Dougall, but I was obliged to give up its internal administration in consequence of its ill effects upon the digestive system. In some cases it aggravated the symptom of indigestion, which I find is invariably present in leprosy subjects, whilst in others it gave rise to diarrhoea; and I did not consider it desirable to weaken the strength of the patients by continuing its administration while we have a much better remedy in *chalmogra* oil, especially as the weaker patients were liable to attacks of diarrhoea and dysentery.

As an *external* application, however, *gurjun* oil is very valuable in the treatment of chronic leprosy ulcers, which heal rapidly under its action; and I do not remember seeing in any single instance the cicatrices open out when it has been discontinued, although fresh ulcers break out in other parts of the limbs, which are similarly healed under its use.

This emulsion also keeps the skin in a soft condition, and so prevents cracking, which is often the commencement of an inveterate ulcer. It has, moreover, the advantage of keeping away flies which infest leprosy patients, and in the absence of cleanliness, give rise to maggots, which increase the extent of the ulcer, but under its use

As a proof of its efficacy, it may be stated that the patients always asked for more of this emulsion than the quantity they were allowed.

The advantages of gurjun oil, then, are the following:—

- I may here mention that, made into an ointment with sulphur, gurjun oil rapidly cures certain skin diseases, such as *tinea circinata*, which are due to the presence of *fungus*.

The application of cashewnut oil has to be repeated when the skin has healed. Until total absorption of the tubercules has taken place, care should be taken that it does not run over the healthy skin, or into the eyes.

4. combined with its not an

unpleasant taste, they preferred it to gurjun oil. Chalmogra oil, moreover, has a direct influence in reducing the tubercules, as seen in cases where cashewnut oil had not been applied, and is therefore particularly adapted in the treatment of leprosy.

4.—*Carbolic Oil*. I have used carbolic acid in combination with sweet or cocoanut oil as a general application with a view to promote the healthy action of the skin, and also as a substitute for gurjun oil when I have not had a supply of the latter; but it is more expensive and less efficacious than gurjun oil.

5.—*Iodide of Potassium*. I have used it with advantage, especially in those cases which were associated with a syphilitic taint, and I believe it promotes the absorption of the newly-formed effusion of the peculiar substance from the different structures.

Diet.—The patients in the asylum received rice and dall as their principal meal. Mutton once a week, and occasionally fresh fish. Potatoes and some of the ordinary country vegetables were also allowed, but they were forbidden to take brinjals, pumpkin and salt-fish, or meat of any description.

During the famine, the quality of food was very inferior, as good grain was not procurable in the bazaar, except at very high prices, and this would require greater funds than were available; the asylum being kept up by local contributions collected monthly by the Roman Catholic chaplain for its support. Owing to the deterioration in the quality of food, several of the inmates suffered from an aggravation of the symptoms during the famine months.

Concluding Remarks.—After what has been described in the foregoing pages of this report, it will appear that, although gurjun oil has no specific curative effect on leprosy, it certainly does ameliorate the condition of the poor lepers, combined with the other remedies detailed above; but, in order that they should receive the full benefit of medical treatment, it is highly desirable that some central asylums should be opened by Government where the patients could be brought more fully under medical supervision, where sanitary rules could be better enforced, and the diet better regulated than in any private asylum.

Judging from Mr. McCorkhill's figures, there were not less than 22.8 per cent. of population, in the Belgaum Districts alone, afflicted with some form or other of leprosy; and considering that it is a disease which is liable to be transmitted from father to son, and propagated by marriage, it calls urgently for the adoption of such meas-

ures as will not only palliate, if not entirely remove, the suffering of the afflicted, but in all probability prevent the spread of this loathsome disease.

I am indebted to G. McCorkhill, Esq., C. S., for the following statistics of leprosy in the Belgaum Districts from the census of 1872:—

In this collectorate, the total number of those disabled by infirmity is 4,131, or 44 per cent., or 44 per cent. of the entire population. The proportion of male infirmities to female is 60.8 to 39.2. Of the total number of infirm, 61.2 per cent. are either deaf, dumb or blind; and 22.8 per cent. are affected with one or other type of leprosy.

NOTES OF CASES TREATED.

In Dr. H. Vandyke Carter's paper on leprosy, an abstract of fifteen cases is given from notes taken in 1876 and 1877, and certified by Dr. Peters. A few of these cases are as follows, three of the patients, subsequent to marked improvement, dying of diarrhœa:—

CASE I.—Alkous Sarson, nine years in the Leper's Home (1876). Ill 20 years; body covered with brownish-black patches, which are anæsthetic; fingers and toes contracted. The knee-joints and wrists more or less stiff, and has been a cripple for years. The disease first commenced in white and brownish-black patches on the thigh; while in the asylum five years ago had a violent attack of fever, which subsided on a rash breaking out over the whole of the body which still covers the trunk.

Treatment.—The cashewnut oil was applied along the knee-joints, and the contracted fingers and the ulcers healed with gurjun oil emulsion. He has been able since to walk better and go over a mile to the Roman Catholic Chapel.

This man who has been the oldest inmate of the asylum, was a great sceptic, and would not take any medicines at first, but seeing that his comrades were improving, he took to treatment, and even went so far as to apply the cashewnut oil all over the legs and thighs, not minding the blisters caused thereby. He then sent for his son, who was born a year before the disease first broke out in him, and was at this time suffering from anæsthetic patches, like his father, on different parts of the body, to place him under treatment.

This man is reported to have died during the famine season.

CASE II.—Luxmon. Leprosy for ten years, and in the home for eight, (1876).

Nostrils affected; tips of fingers and toes destroyed. No hair in the eyebrows, but that of the head and face good. Had three sores on the sole of right foot, six on the left foot; of these, two in the left and one in the right have now closed under the use of gurjun oil ointment. The largest and the oldest one is nearly healed; a small ulcer, however, has recently appeared on the left foot. Had tubercles over both arms, which have now disappeared. States that sensation has returned in the left foot, but that the right foot and both arms are still more or less anæsthetic.

14th October, 1877. Fresh sores on the left foot; the old ones have healed. 22nd November, 1877. Sores almost healed.

CASE III.—Kanuba. Ill seven years; four years in the home, (1876).

Six months after treatment commenced the sore on the left ankle was nearly healed, that on the right ankle was contracting; tubercles in the lobes of the ears very much less, and face improved in appearance.

18th October, 1877. Old sores on the left foot perfectly healed; new sores formed on the right foot.

CASE IV.—Isram Parub. Two years in home, (1876). Has three ulcers on right foot and one on the left, one on the left hand; fingers of the right hand contracted; left hand partially so. All the toes are contracted; could not walk on account of stiffness of the knee-joints. Has been applying the cashewnut oil to the joints and the gurjun oil over the sores, and can now walk great distances. All but one sore completely healed; the one remaining open appears to be connected with a piece of diseased bone in the dorsum of the foot.

14th October, 1877. Sore in the right wrist healed. There is a burn mark on the left hand middle finger, caused accidentally by fire. Right foot still troublesome on account of the diseased piece of bone.

CASE V.—Yellappa. Right leg was first affected. There are anæsthetic patches scattered all over the body. Tips of three fingers of the left hand ulcerated and contracted. Ankle-joints stiff, to which cashewnut oil has been applied. There was a sore over the left thigh for nearly a year; gurjun oil was applied, and it has closed since. Feels lighter generally.

Remark.—This man died in September, 1877, during the famine. He is stated to have suffered from chronic diarrhœa.

CASE VI.—Poonajee. Four years in the home. Ill seven years; disease first appeared in the calf of right leg. Left eye destroyed by the growth of tubercles two years ago, (1876). There are tubercles in the forehead and cheeks; fingers swollen; legs also swollen and ulcerated.

The big ulcer in the calf of the right leg healed, but fresh ulcers broke out in the feet, and the patient died of diarrhœa in July, or August, 1877, during the famine.

CASE VIII.—Purasnam, aged about 25 years. Ill eight years. In the home two years, (1876); father's father suffered from leprosy.

Left foot, right hand, left hand, right foot, became successively affected, which are ulcerated.

Six months after the use of the gurjun oil emulsion, some of the sores of the feet had healed, another was healing, but a finger in each hand was ulcerated, and two phalanges have been exposed for a month. These came away eventually, and the ulcer closed.

14th October, 1877. Has suffered for nearly two months and a half with an excessive gangrenous ulceration of the left fore-arm, from whence a large *sphacelus* has separated. He was very low, and his strength has to be kept up with stimulants while the ulcer was dressed with gurjun oil emulsion. The patient is now well and able to use his arm and move about. A deep cicatrix now marks the spot.

23rd November, 1877. Has walked over himself about a mile's distance to my house. No more sores in the feet, hands and arms. Quite free from sores.

CASE X.—Krishnee. Ill ten years. In the female asylum four years. Father had leprosy; died four years ago. Used bitter *neem* leaves (*araderachta indica*) both internally and externally. Has lost all the fingers some five or six years ago, some of them were eaten by rats.

Has got a sore at the sole of the right foot. There is loss of sensation in the extremities.

The sore very nearly healed, and sensibility had returned at the extremities to such an extent as to enable her to feel the pain if anything got into the sore of her foot while walking.

CASE XI.—Gunga has been in the female asylum for five or six years. Became afflicted with leprosy shortly after her marriage some five or six years ago. Child died three days after birth.

Face and hands slightly affected, but the legs have chronic ulcers, one in particular over the skin, which, she says, has been in existence for several years.

In this very interesting case all the sores healed under the use of gurjun oil, including the old ulcer over the skin; and up to the time that I was in Belgaum, (November, 1878) no fresh ulcers had formed.

CASE XV.—Jairam Loobroo, aged about 25 years, ill about four years. Father's mother had leprosy, sister also leprous, and now in the female asylum.

Had syphilis; tubercles on the cheeks, lobes of the ears and glans penis. Hands and feet anæsthetic, commenced with a papular eruption over the hands and feet, then the face.

Treated himself with lemon oil and kapila powder (powdered *nux vomica* seeds) without avail.

N. B.—*Nux Vomica* seeds powdered are given with lemon juice in dyspepsia to promote the appetite and increase the digestive power. Under treatment the skin assumed a healthy appearance; the tubercles remained much the same.

DR. DOUGALL'S TREATMENT WITH GURJUN OIL.

Dr. Dougall, M. D., Surgeon-Major, Officiating Senior Medical Officer, Port Blair, in his Medical Report of April, 1874, presents 24 cases treated by him in six months. He says, "As to the therapeutic value of gurjun oil in the treatment of leprosy, I can only speak from my own observation here, as I never heard and nowhere read of it being used in this disease; and in fact the only medicinal use I had read of it being applied to was in cases of gonorrhœa; where it is said to act like copaiba. Of the 24 cases under treatment here during the past six months, every one of them has decidedly benefitted by its use, every ulcer without exception has healed up and not broken out again, but the most marked benefit has been derived by those suffering from the anæsthetic form of the disease."

The plan of treatment is thus described by Dr. Dougall:—

"They turn out at daylight (say 5.30 A. M.), after a little time they supply themselves with a small quantity of dry earth finely pulverised, which is kept ready in a tub under the hospital; with this dry earth they all proceed to a small stream in the neighborhood where they thoroughly wash themselves using the dry earth as a detergent; having accomplished this task, they return to the leper ward by 7 A. M., where they sit in a row, and each man is then served with his morning dose of 4 drachms of wood-oil and lime water mixed in equal proportions. Having seen this swallowed by all of them, the apothecary sees that each man has some small vessel (usually half of a cocôanut shell) into which the compounder puts a quantity of the gurjun ointment, and with this they proceed to rub themselves all over, not merely by smearing it on, but thorough and continuous friction is kept up for two hours, and the compounder all the while is walking up and down the line armed with a tin of the ointment and a spatula for distributing more of it as it is required amongst the patients, and no limit is placed upon the amount given further than that whatever is given must be well rubbed in. The rubbing is thus continued till 9 A. M., then the men set about getting their food, and latterly they trim the ground

around their own quarters and excavate earth-work, and it is pleasing to see the will with which men who for years had not been able to handle a walking stick on account of loss of fingers and numbness in the arms now set about this sort of work, and they are evidently proud of being again able to work, when such a hope had been abandoned long ago.

At 3 P. M., the lepers fall in and get their second dose of half ounce of the gurjun emulsion internally and then the gurjun ointment is supplied to them as in the morning as already described; the rubbing is kept up from 3 to 5 P. M. The prolonged rubbing is not only insisted on for the sake of the action of the ointment upon the skin, but because I consider any gentle employment combined with exercise is beneficial both physically and mentally: by physical exercise the whole system is improved in tone, and the mind is benefited by their attention being withdrawn from their former hopeless condition and they are led to compare the present with their past.

The preparation referred to above is made as follows: Lime water, 3 parts; gurjun oil, 1 part; mix and agitate them violently until they thoroughly unite and form a substance of the consistence of Indian butter. This I have named gurjun ointment. At the same time I prepared a thinner mixture for internal use composed of equal parts of lime water and gurjun oil, and this combination is not disagreeable to the palate; and although the lepers now get half ounce doses of the emulsion night and morning, they constantly ask for more.

The change the tubercles undergo in the process of reduction is worthy of notice. After the lapse of some time the tubercle seems to become more moveable and loose at the base and it is felt to be softer there than at the apex, this softening process gradually approaches the surface and at last a watery bleb forms, and this bleb soon bursts and allows a thin serous, clear fluid to escape, and a marked diminution is then observed as regards the size of the tubercle as compared with its former dimensions. This may take place two or three times, until the tubercle is quite reduced. I found it expedited matters very much to puncture these watery vesicles with the point of a lancet, and it allowed the fluid to escape without pain or inconvenience to the patient and did not interfere with the rubbing process. I have seen a tubercle on helix of ear entirely subside after one formation of this vesicle.

The gurjun ointment, though thoroughly rubbed on the surface of

the body for four hours every day, produces no vesications directly from its action and causes no pain whatever. It seems to be through its constitutional effects that the tubercles soften from within outwards. I have rubbed it over my own arm, and it did not cause the slightest pain or redness though allowed to remain on all night.

The emulsion is not disagreeable to the palate, and at first it had no well marked influence upon the digestive system; but when the dose was increased to one drachm twice a day it improved the appetite and at the same time acted as a mild laxative.

It has also a distinct diuretic effect; and the larger dose (4 drachms) twice a day caused several large healthy motions, in fact acted as a powerful diuretic and evacuant.

The duration of the present investigation was arbitrarily limited by myself to 6 months. The time has been long enough to show that leprosy, both tubercular and anæsthetic, cannot only be arrested, but the condition of the lepers can be greatly ameliorated; and men here who have not for years been able to do more than drag out a miserable helpless existence are now able and willing to work, and every sore is quite healed. In some instances the sores have been healed up for more than three months and show no tendency to reopen; and these desirable results have been attained simply by the use of gurjun oil and lime water, substances which are so cheap as to be within the reach of all.

No change whatever has been made even in the most minute particular in regard to the diet of the lepers from what they have been getting for years past, and they get their fish four times a week as usual. I always thought and still consider the men underfed, still I made no change in order to avoid complications and to test the gurjun oil on its merits. It is not the lime that has the beneficial effect, because the improvement commenced before the lime was given at all, and has continued in cases where only the oil and lime water mixture was given.

Any medicine that can ameliorate the condition of the lepers throughout the various countries where the disease exists is not less likely to be brought into common use because it is cheap, easily prepared and applied, and the supply inexhaustible, and many poor lepers may be able to use these preparations who might find it difficult to obtain a liberal diet, fresh meat, milk, wine and foot-baths of hot cocoanut oil with the skilled attendant and his thermometer to look after the temperature. None of the above are required in this

plan of treatment. I have had the lepers washed daily with water and dry earth, using the dry earth not only because it is cheaper than bran or soap, but because it is a better detergent than either.

The gurjun ointment keeps well, especially when not too freely exposed in bulk to the atmosphere, because the CO_2 in the air is apt to convert a small portion of the $\text{Ca H}_2 \text{O}_2$ into $\text{Ca CO}_3 \times \text{H}_2 \text{O}$. I keep it in here a large jar with a wooden lid.

TREATMENT AT BANKOORA JAIL.

Babu R. M. Banerjee, Superintendent of Bankoora Jail, (July 25th, 1885), says: "In the time of one of my predecessors, oil of garjan was chiefly used, both internally and externally; but it was given up, and arsenic was substituted in its place, and *nim* oil is rubbed externally; I am in the habit of giving them arsenic in the following combination: Arsenic, 60 gr.; sulphate of iron, 60 gr.; with extract of gentian, which is divided into 60 pills and one to be given twice a day after meals."

EXTRACTS

FROM A REPORT BY T. R. LEWIS, M. B., AND D. D. CUNNINGHAM, M. B.,
SPECIAL ASSISTANTS TO THE SANITARY COMMISSIONER WITH THE
GOVERNMENT OF INDIA, 1877.

The report of these gentlemen was based upon clinical observations made at the Almora Leper Asylum, and investigations in the Kumaun District. In the asylum eighty lepers were subjected to the closest scrutiny; 49 proved to be cases in which anæsthesia presented the most prominent feature; 12 in which the presence of tubercles in the skin was the most marked peculiarity; in 15 cases

the two former conditions were so equally evident that they were classified as "mixed;" and in 4 cases an eruption formed the most pronounced symptoms. The ratios which these yield agree generally with the proportion in which the different varieties of the disease have been observed to occur in other countries.

The average age at which the outset of the disease was observed was found to be between 23 and 24 years; even the decimals obtained by calculating averages in the case of male and female lepers were found to be almost identical. There was, however, a range of from 3 years to 60. The average duration of the disease was nearly 14 years. The form in which anæsthesia was the prevailing feature was the most chronic, the average duration of the "tuberculated" cases being shorter by nearly six years.

The history of the asylum gives no support to the doctrine that leprosy is a contagious disease, but strong evidence to the contrary. The reverse has been stated with regard to the history of the asylum, but it will have been seen, from the information elicited, that not the slightest foundation existed for such a statement.

But with reference to the probable influence of heredity in the propagation of leprosy, the facts elicited and which may, we believe, be accepted as trustworthy, give forth no uncertain sound. There can, we think, be no very substantial argument adduced in the face of the figures which have been collected in connection with this asylum alone to contra-indicate the influence that hereditary taint exercises a most important influence in the transmission of the pest.

Taking into consideration, therefore, the prominent part undoubtedly played by heredity, and the fact that the disease but seldom manifests itself until after puberty, it is evident that any attempt at "stamping it out" by the compulsory segregation of leprosy persons would prove wholly impracticable; for, it would not only be necessary to segregate those suffering from developed disease, but also those hereditarily disposed to it. How, and by whom, could the predisposition be determined? It would, indeed, be even more important to secure the latter class, and such persons as are only manifestly affected to a slight extent; for it would appear that persons of this description furnish by far the greater portion of the children who are, so to speak, potentially leprosy,—time and circumstance alone being required for the development of the disease.

In intimate relation with this question is that of the probability or otherwise of an increase in the prevalence of the disease amongst

such a leprous community as exists in Kumaun. Fortunately it would appear that, *pari passu*, with the active manifestation of the disease, a tendency to sterility is also induced; moreover, the mortality among the children of lepers (even among such of them as are born before leprosy has manifested itself in the parents) appears to be abnormally high, so that the probable aggregate number of the offspring of lepers is to a very appreciable degree less than that furnished by non-leprous individuals. It is therefore evident that unless there be influences other than heredity at work in the locality, tending towards the production of the leprous condition, no serious increment need be apprehended.

Leprosy in Ancient India. The disease has been known to exist in India for at least 3,000 years, but comparatively little was definitely known regarding its localisation in the various parts of the country until the results of the censuses of 1872 had been published. Very important advances have, within the last few years, been made in the acquisition of knowledge regarding the pathology of leprosy; but with regard to our definite knowledge of its actual causation, it is to be feared that we have not, except phraseologically, advanced very much on the etiological views recorded by Atreya many centuries B. C., which were to the following effect: "When the seven elements of the body become vitiated through the irritation of the wind, the bile and the phlegm, they affect the skin, the flesh, the spittle, and the other humours of the body. These seven are the causes respectively of the seven varieties of *kushta*, (leprosy)."

Atreya I., who is supposed to have lived probably nearly 2,000 years B. C. continues in the *charaka sanpita on the pathology of leprosy*.

"The *kushta* thus produced cause much pain and suffering. None of these varieties result, however, from the vitiation of a single humour. *Kushtas* are of seven, of eleven, or a larger number of a kind; and these constantly irritating the system become incurable. We shall give a brief account of these as they are produced by the vitiation of the different humours. The wind, the bile, and the phlegm, being vitiated, re-act on the skin, &c. When the wind is most vitiated it produces the *kapala kushta*, the bile the *audumbara*, the phlegm the *mandala*, the wind and the bile the *rishyajikva*, the bile and the phlegm and the wind the *sidhma*, and the three together the *kakanaka*.

Excessive physical exercise after exposure to too much heat or too much cold; taking food after surfeit; eating of fish with milk; using barley with several other grains, such as *hayanaka*, *dalaka*, *karodusa*, &c., along with venison, milk, curdled-milk and butter-milk; excessive sexual intercourse; long protracted excessive fear or labor; fatigue, interruption of catarrh,

&c., vitiate the phlegm, the bile and the wind; hence the skin and the three others become slackened. Thus irritated, the three elements corrupt the skin and others, and produce *kushta*.

The premonitory symptoms of *kushta* are as follow: want or excess of perspiration, roughness, discolouration, itching and insensibility of the skin, pain, horripilation, eruption and excessive pain on the parts that are about to fall off.

Some *kushta* eruptions are red, rough, spreading and small; they cause horripilation, slight itching, pain, and discharge of matter and sanies. These are caused by wind, and are called *kapala kushta*, (scaly).

Those that are of a coppery colour, which discharge matter, blood and sanies, cause itching pain, inflammation and burning, and produce worms, are also caused by wind. They appear like the ripe fig, and are hence called *audumbara*, (fig like).

Some are cold to the touch, raised, hard, reddish-white, clammy, itching and infested with worms. These two are caused by wind; they are called *mandala* (circular).

Those which are rough, red, white, yellow, blue or coppery, producing itching pain, worms, burning sensation, and insensibility, are also caused by wind. They have the appearance of the tongue of an antelope, and are hence called *rishyajikva*.

Those which are white or red, spreading and elevated; which discharge blood, pus and sanies, and produce itching, are also caused by wind. They appear like the leaves of the white lotus, and hence are called *paundarika*.

Those that are rough, red, thin, internally cold, sometimes reddish-white, which cause slight pain, itching, burning, and discharge of pus and sanies, are also caused by wind. They appear like the flowers of the pumpkin and are called *sikhma*.

Katnaka and others have all the symptoms of *kushta*. They are incurable, while others are curable. That which is incurable can never be cured, and those which are curable sometimes become incurable.

The wind causes coppery-red, roughness, pain, inflammation, shrinking, horripilation, and insensibility of the skin. The bile produces burning, perspiration, pain, discharge of blood, and suppuration. The phlegm causes whiteness, coldness, itching, and confluent pimples.

The worms that form in leprous eruptions destroy the flesh, skin, veins, muscles and bones. When affected by them, the patient suffers from spontaneous discharges of blood, insensibility, loss of sensibility of the skin, mortification, thirst, fever, dysentery, burning, weakness, disrelish and indigestion. Then *kushta* becomes incurable. The man who neglects the disease at its commencement is sure to die. He, who at the first breaking out of the disease tries to get rid of it, may be sure of its being cured.

PREVENTION OF LEPROSY BY SEGREGATION.

BY BRIGADE-SURGEON H. V. CARTER, M. D., 1884.

The following brief memoir is the third I have compiled for submission to the authorities of British India; and, like its first predecessor, it is based upon unique experience acquired through the enlightened proceedings of the Government of Norway.

By the kindness of Dr. G. A. Hansen, the able Superintendent of the Leper Department, I am enabled to offer the latest known statistical data; and by the courtesy of the Director of the Civil Medical Service in Norway, I have been supplied with a series of reports in continuation of those described in my earliest communication to the India Office, 1873. Since 1875, some changes in these have been made; and in future, only quinquennial reports will be issued: the next being due in 1885.

Considering afresh the information thus accruing, I propose, in the interests of India, to discuss: (1) The present state of the leper question in Norway; (2) the probable explanation of amendments noted; and, (3) Hygienic measures suitable for India. An illustrated note on the pathology of leprosy is also subjoined.

PART I.

PRESENT STATE OF THE LEPER QUESTION IN NORWAY.

The methodical isolation of lepers has, during the past 25 years, been carried on with unremitting effort; the result being a decided diminution of the sick throughout this period. On initiation of the restrictive measures sanctioned, it was not anticipated that marked effects would quickly follow; and hence no dissatisfaction is

expressed at the moderate and gradual amendment which has ensued. Recognizing from the first the incurability of leprosy, the State limited its attempts to opposing the hitherto continuous reproduction of disease; and such anticipatory sphere of action admits only of radical rather than showy achievements. How much longer these somewhat costly measures may have to be maintained cannot yet be said; but it has been learnt that restrictive means ought, if possible, to be extended, and could be remitted only at imminent risk of renewed spreading of disease.

Registration of the affected being an essential preliminary, I note that properly it includes, besides an enumeration of the lepers, a due record of their history and movements. In Norway the district medical men have always been aided, under express injunction, by "all clerical and secular officials and functionaries" of Government; and the peasantry not opposing, it might be expected that the yearly register would be fairly exact. In this matter, however, precision is everything; and it has long been apparent that so simple a result as a strictly accurate list of lepers is hard to be obtained. Thus the malady in question begins obscurely and proceeds slowly; it seldom early disables; being at first set down as a blemish, it is disregarded by patients and their friends; and since, in addition, many bad subjects purposely evade registration, it results that of the "fresh addition" brought to light year by year only 1-6 are "new cases" of quite recent origin, whilst 5-6 are entered as "overlooked" cases dating back 2, 3 or several years to the beginning of illness. As to the possible number of such latent *residua*, Dr. Loberg, in 1870, liberally estimated them at 300 (*vide* my first report, p. 17); whereas by the adjusted tables of 1880 it appears there must have been then at least 500 unrecognised or undetected lepers in the country, or one-quarter more in excess of the 2,050 actually known. This datum illustrates the difficulties of registration which are met with in Norway, and which also, I may add, obtain in Western India; since *e. g.*, instead of the census (1871) number of 158, I found there were at least 472 lepers existing in Káthiáwár during 1876, most of whom had of course been overlooked (*vide* Káthiáwár Report, p. 65). The Norse Tables show separately the number of asylum inmates (duly known and named) and of home-dwelling sick (only approximately ascertained); these combined numbers furnishing a plain total, which, for convenience, is added in column 10 of the statement below. Such ordinary enumer-

ation is not, however, of more than very limited value; and in 1870 the tables supplied an adjusted list of lepers, combining in addition the numbers who, to judge from their aspect and ascertained duration of illness, must for varying periods have been all along living unregistered in the country districts.

Such numbers are still considerable—*ex. gr.* On comparing the list below, column 3, with a later one for 1881, I have been privately favoured with, it appears that during this last year alone no fewer than 74 “overlooked” cases were found which had to be incorporated with the figures in the preceding year’s list at dates corresponding with the beginning of illness as follows:—17 of 2 years’ duration, 17 of 3 years’, 10 of 4 years’, 2 of 5 years’, 4 of 6 years’, 8 of 7 years’, 3 of 8 years’, 1 of 9 years’, 1 of 10 years’, and so on; 4 being referred back so far as 25 years. Besides these, there were 16 strictly “new” cases brought to light in 1881: the total “fresh additions” (as I here use the term) in that year amounting, therefore, to 90. The latest issued table in the amended form is the one for 1880, which is copied below in columns 1 to 9 inclusive:—

Tabular Statement of the Number and Movements of all the Lepers known in Norway during the Years 1856-1880 inclusive.

YEAR.	Total at Beginning of Year.	New Cases.	DIMINUTION BOTH IN AND OUTSIDE ASYLUMS.				REMAINING AT END OF YEAR.		Total at end of Year.	Total at end of Year, by old Enumeration.
			Died.	Discharged	Cured.	At Home.	In Asylum			
Column 1	2	3	4	5	6	7	8	9	10	
1856....	2,628	235	2,863	2,113	
1857....	242	293	16	2	2,367	427	2,794	2,060	
1858....	235	225	4	2	2,323	475	2,798	2,082	
1859....	249	213	8	7	2,296	523	2,819	2,095	
1860....	226	253	9	2	2,242	539	2,781	2,068	
1861....	246	238	14	4	2,060	711	2,771	2,096	
1862....	201	212	12	4	2,046	698	2,744	2,119	
1863....	189	195	6	4	1,979	749	2,728	2,162	
1864....	213	202	9	1	1,948	781	2,729	2,182	
1865....	200	205	9	5	1,938	772	2,710	2,136	
1866....	220	213	10	3	1,909	795	2,704	2,137	
1867....	185	182	7	5	1,898	787	2,685	2,136	
1868....	215	211	7	6	1,888	788	2,676	2,119	
1869....	167	200	16	8	1,832	787	2,619	2,104	
1870....	160	230	13	3	1,769	764	2,533	2,055	
1871....	153	238	16	3	1,682	747	2,429	1,987	
1872....	126	205	9	5	1,628	708	2,336	1,943	
1873....	122	177	18	8	1,583	672	2,255	1,874	
1874....	135	183	10	5	1,549	643	2,192	1,832	
1875....	123	203	14	5	1,470	623	2,093	1,771	
1876....	110	187	6	2	1,395	613	2,008	1,731	
1877....	90	165	7	3	1,294	629	1,923	1,704	
1878....	90	139	10	9	1,237	618	1,865	1,681	
1879....	39	162	11	4	1,115	602	1,717	1,642	
1880....	29	150	7	7	965	617	1,582	1,606	

REMARKS ON THE ABOVE TABLE.

The headings of the several columns mostly explain for themselves. Only the figures in columns 4 (deaths), 5 and 6 (discharged and cured), and in column 8 (asylum inmates), are certain and fixed; all the other numbers being approximate, or liable to rectification in course of time.

A.—DECLINE OF LEPROSY.

This fundamental point is capable of being established in various ways. Thus, according to the enumeration in column 10, at the end of 1856 there were known 2,113 lepers, and in 1880 only 1,606; showing a diminution of 507 in the course of 25 years. But if (as in the adjusted lists) all overlooked cases whose duration dated 2 or more years back be added in their due place, there must have been at least 2,863 lepers (*vide* column 9) in 1856; and in the succeeding years a corresponding number gradually declining until the latest, when the same annual enumeration is found in both columns—the small difference here of 24 referring to lepers sent to the asylums without ever being registered in the country districts. According to the new reckoning, therefore, the total decline of lepers amounts to 1,281; but this estimate probably is nearly as excessive as the other was defective, because no allowance is made for cases still remaining undetected in 1880. What the precise decline of leprosy has been cannot indeed yet be learnt, and strictly not until the demise of every leper in the country will it be ascertainable: this drawback being inherent to the exacter method of registration. Probably the diminution has amounted to near 1,000, or about one-third of the total known in 1856; and this would be a very notable result to attain in so short a time.

Confirmation of the opinion now expressed, is the following:—According to the above tabular statement the total of new cases (column 3) has been 3,965, while the total outgoings (columns 4, 5 and 6) have amounted to 5,246, leaving a deficiency of 1,281, which being far too considerable to be attributed to oversight becomes explicable only on the inference of a real decline of disease. Again, some details of column 3 not here shown, are, I find, very significant: thus, in former years there were about 250 “fresh additions” annually registered, now only about 130; of these upwards of 100 used to be of quite recent origin, whilst now only 25 in the mean are “new” cases.

h successive years might vary, yet

registration continuing at least as efficient as ever, this datum becomes conclusive of real amendment; and that in the best possible direction. So also the following:—The proportion of “new cases” to total “fresh additions” used to be 40 per cent., the remainder being made up of “overlooked” cases of more or less prolonged duration; whereas now only 16 per cent.: that some overlooked cases will hereafter come to light is inevitable, but it is of good augury that these already form the very large majority of fresh additions, the strictly new cases becoming both relatively and absolutely smaller by degrees, and indubitably less.

Lastly, some indirect evidence may be adduced. Relying on the immutable figures in column 4, I note that the mean annual deaths of lepers is now 180 instead of 244 as formerly; whence, on the presumption that the leprous disease has remained unchanged, it becomes evident there are now fewer subjects affected by it. According to column 10, the annual death-rate has declined from 14.2 per cent. in 1857 to 9.3 per cent. in 1880; and there being no proof or belief in Norway (so far as I am aware) that the pest is in character so much less severe or fatal now than formerly as these two ratios would imply, it follows that in earlier years there were more lepers living than are entered in column 10: those entered in the amended column 9, with a nearly uniform death-rate throughout of 9 per cent., giving manifestly the correcter estimate. Supposing, therefore, leprosy to be in Norway the same scourge now as ever, on this basis I reckon there may have taken place a diminution of about 30 per cent. in the total number of its victims.

The above data, in general, concur; and there being none to my knowledge adverse, the point in question must be regarded as affirmed.

**B.—MOVEMENTS AMONGST THE LEPER COMMUNITY: COLUMNS 4, 5 AND 6.
—COLUMN 4, MORTALITY.**

For the whole 25 years the mean annual deaths are 202; of late about 160 only, of which 87 in asylums and 73 in the districts. Formerly, when the afflicted were more numerous, the deaths also were commoner and rather most frequent in the districts. The mean death-rate of leprosy in Norway is 8—9 per cent. per annum: amongst the incarcerated (who include the worst and most advanced cases) the mean death-rate rises to 9.14 per cent. per annum, whilst among home-dwelling sick it may be estimated at 5.7 per cent. per

annum. For many years past there has not occurred any marked or progressive change in the mean death-rates; thus, in 1862 that of asylums was 13 per cent. and of districts under 6 per cent., whilst in 1880 the former was 11.3 per cent. and the latter also under 6 per cent. The greater range among asylum inmates than outside these institutions is owing, as appears, to occasional brief outbreaks of local sickness (see below).

COLUMN 5.

In the mean about 10 subjects yearly leave the asylums uncured, or outside become lost sight of; equal to about $\frac{1}{2}$ per cent. of the totals known. In Norway, as elsewhere, lepers are subject to home-yearning, secretiveness and impatience of control; but there are fewer facilities for evasion or decamping here, than would be in India.

COLUMN 6, THE HEALED.

The Norwegian authorities have always candidly recognized and published a paucity of results under this heading, which of itself betokens the present hopelessness of a cure for leprosy, and the need of sole reliance on preventive measures, for mitigation of this scourge. In the table are entered only 107 as healed, the total annual mean being 4 or 5 cases reported from both districts and asylums; equal to 1.63 per cent. of grand total of lepers 6,918, or yearly less than $\frac{1}{4}$ per cent. Nevertheless, the systematic use of drugs is practised in the asylums, and particularly in Lungegaard Hospital under charge of the venerable Dr. Danielssen, where are admitted cases specially adapted for early and energetic treatment. It appears from reports that most recommended remedies have been fairly tried, yet without any uniformly successful result; and some partial mitigation of suffering is as yet all that drugs can effect. I also note that the detailed tables have a column for cases relapsing into sickness after 'healing'; and from observation everywhere, it is known that the more prominent marks of disease may spontaneously subside, more or less, and remain in a *quasi* latent state for several months, or years. In confirmed cases, some evidence of the infection may at all times be detected; so that 'cure' becomes a provisional expression. And, lastly, I see in these European documents a reflex of Indian experience; in the occasional disappearance of skin disease termed leprous, but really of a different and more amenable character.

C.—THE ISOLATED AND NON-ISOLATED: COLUMNS 7 AND 8.—COLUMN 7,
HOME-DWELLERS.

Necessarily, from their large numbers, all lepers in the country could not be relegated to asylums; but the aim has been to isolate as many as practicable under existing conditions. The result is, according to the table, that the series of district-residents is a steadily diminishing one, now amounting to only 37 per cent. of its earliest sum. At successive decennial periods the numbers in columns 7 were as follows:—1860, at home 2,242 or about 80 per cent. of total lepers then known; in 1870, at home 1,769 equal to about 70 per cent.; and in 1880, at their homes 965 or about 61 per cent. of all afflicted then known. By the year 1885 it is anticipated that 50 per cent., or one-half the entire leper-community, will be isolated; and by 1895 it is hoped that 75 per cent. may be so separated, leaving only 25 per cent. at unrestricted liberty amongst healthy persons. That there really has taken place this most desirable diminution in the number of free home-dwelling sick is shown inferentially by the lessened proportion of deaths therein occurring; thus, whilst during 1860-70 the numbers dying both within and without asylums were nearly identical, during 1870-80 the proportion of asylum-deaths rose to 71.6 per cent. and that of district-deaths sank to 28.4 per cent. of total declining loss of life from leprosy in Norway is due solely to lessening of home-mortality; and the smaller this becomes, obviously the better for the common weal.

COLUMN 8, THE IMMURED.

In a population of any size the amount of asylum-accommodation must be so limited, that only a part of all lepers can be segregated from the sound. In Norway, three large and two smaller institutions—of which three at Bergen and two further north—comprise the valuable means of isolation; capacity equal to lodgment of 800 sick: total population of country about 2,000,000, total lepers still near 2,000. The minimum of incarcerated was 235 in 1856, the maximum 759 ten years later; and thence a slow decline to 617 in 1880. This decline is not due to lessening of accommodation, but to persistent unwillingness of the peasantry to send in their sick; and I learn it is now contemplated to seek more compulsory legal powers of segregating lepers, if not in the asylums then at their own homes. That a real and continuous progress of isolation has, however, already been affected is evident:—thus, at first in 1856,

only about 8 per cent. of sick were immured; in 1860, the figures were 539 in 2,781, or 19 per cent.; and in 1870 they had risen to 764 in 2,533, equal to 30 per cent. In 1880 the figures were 617 in 1,582, or 39 per cent.; but this datum is an uncorrected one, and it may be that the ratio of immured to free has not of late much increased. If this surmise be as correct as it seems there is, I would remark, additional reason to urge isolation at home in aid of the more public means. The numbers yearly admitted into the asylums during the past 20 years has varied from 173 to 112: during the last quinquennium it has been about 125, a minute proportion of these being due to transfer and re-admissions. The outgoing by disease amongst the immured also varies, their occasionally happening brief epidemics of erysipelas, pneumonia or diarrhœa, though such signs of 'hospitalism' are not, I think, commoner in Leper-Asylums than in other collections of sick persons. Further details regarding these institutions will be found in my earlier report; and here I will only add that amongst their inmates there is commonly a slight predominance of women (319 females to 298 males in 1880); whilst outside, men are most numerous—843 males to 763 females in 1880.

PART II.

PROBABLE EXPLANATION OF AMENDMENTS NOTED.

According to the preceding Section, in Norway there has of late years occurred a distinct decline in the number of lepers, and this under opposite conditions; namely, on the one hand a continuous production of new cases, and on the other a large effacing death-rate. A third important condition, however, intervenes; and that is, the complete isolation of a large proportion of the affected persons. Other possible agents in the amelioration noted will also be alluded to below.

In limine, I should state that the 'cure' of leprosy by purely medical treatment has not practically contributed anything towards obliteration of the disease. To rely, therefore, for a general amendment upon any of the varied remedial measures often confidently

put forward would be to indulge in fallacies hurtful as well as deceptive, and to encourage a kind of anticipation hitherto shown by experience to be futile.

Next, that the disease is subsiding from a 'natural' cessation of its growth seems to be disproved by the following consideration:—Supposing no re-production of the malady, its decline would be much quicker than is now happening; for with a death-rate of 10 per cent. per annum the 2,863 cases alive in 1856 would in the course of 7 years have been reduced about one-half and at the end of 14 years to about 650, and so on, till, at the end of 25 years, there would remain only about 200 lepers, whose mean age would not be less than 60 years—assuming the mean age at starting to be 35 years. In reality the rate of decline would be more rapid than this, because the death-rate rapidly rises with advancing years: thus the Norse Tables show that not less than 40 per cent. of all lepers die between 31 and 50 years of age, 17.2 per cent. dying earlier at 21-30 years. But the same tables prove that there has not occurred any such rapid diminution of the pest; there now being known at least nine times as many lepers living as should be, on the hypothesis of a direct dying out of disease in the country. Moreover, that leprosy in Norway really displays any natural tendency to subside is disproved by the researches of Dr. Hansen (report of 1880, pp. 17-8), who shows that in most of the affected districts the death-rate is not by any means in excess of the increase-rate; the very reverse, indeed, being the fact—which indicates that the natural tendency of leprosy is more or less rapidly to extend.

Thirdly, the decline of disease might be attributed to mitigation of various hurtful agencies, popularly associated with its origin: *e. g.*, to the lessened use of a fish diet, to a less harsh and insanitary mode of life, or to the extended cultivation of an originally noxious soil, or to some climatic improvement. But, whilst the coast-dwelling peasantry of Norway, in comparison with other (not all) countries of Europe, have admittedly long dwelt in a backward hygienic condition, living much on fish and potatoes, intermarrying freely, and being subject to overcrowding during their long winters; still, on the other hand, it is notorious that they are an unusually well-developed and long-lived race: and besides, individual lepers are, as often as others, even robust people. Generalized statements, therefore, not sufficing to uphold the view suggested, it ought to be shown when and where hygienic improvements have had an exclu-

sive connection with the decline of leprous disease inside limited areas, often placed wide apart; as well as with its diminution during short periods of time. Evidence of this kind, however, I have not met with; and on further comparing the conditions under which leprosy now flourishes in other parts of the globe, I fail to find any cogent evidence that this disease is essentially dependent upon mal-hygienic states, resembling those long prevalent in Norway. Experience here (as elsewhere), rather points to its dependence on personal conditions; for where most abundant the disease is there it is most irregularly distributed: thus, amidst healthy spots in Norway there are adjoining ecclesiastical areas with about 2,000 people (all living under closely similar states and habits), where the number of lepers was known to vary as much as 80, 30 and 8—these figures being now reduced respectively to 17, 15 and 0, without any notable change in population: and to attribute such striking local variations solely to widely operating agency seems to me both rash and, in the presence of a closer acting influence, needless. Nor to my mind, any more satisfactory is the assumption of some vague individual predisposition amongst the affected.

In his report for 1875, Dr. Hansen discusses this subject in the only suitable way, namely by reference to examples: he remarks (p. 60) that if mal-hygiene operated as a direct, or (through rousing hereditary taint) as an indirect cause of leprosy, there should before the asylums were erected have been proceeding a decided hygienic improvement, the effects of which were manifest just when the practice of isolation began; such improvement also ought to have preceded or attended, at least, the after course of disease; hereditary influence, too, then being checked, as well as the spontaneous appearance of new cases. But of all this there is no evidence, the facts known tending rather to disproof. In more detail, the districts of Tromsø and Trondhjem should present a remarkable picture of hygienic progress: thus, during 1857-60 little or no isolation and an advent of new cases in 1856-60 and 1861-65 almost identical of 352 and 361 respectively—also no sign of hygienic advance; but in 1861-65 there were sent 293 lepers into the asylums, and during the following 5 years the new cases declined by 37—a number almost precisely corresponding to the estimate, which might have been made from the prior rate of increase proportionate to number of home-dwellers. Is it imaginable, here, that any culture-amendment had then suddenly culminated and found expression? Next comes

the fact that, in general, leprosy still continues to progress at its former *ratio*; which would show that hygienic changes, even if concurrently made, can have had little or no influence on the progress of the disease. And further, were hygiene (in the ordinary sense of the word) really so operative as is urged the isolation of lepers must offer scanty promise of good, as not itself materially lessening hurtful conditions; but this inference is contrary to other reasonable deductions. Some of the above remarks apply to hereditary influence, as a source of leprosy infection; for in not a few examples of local decline of disease submitted to analysis there has been found too prompt and decided an amelioration in families to permit of this slow-acting agency being regarded as mainly influential. And in sum, so far as appears to me, leprosis can be directly mitigated by dietetic, hygienic or climatic influences only to the same extent as, and no further than, the analogous chronic infections of man, known as syphilis and tuberculosis.

Lastly, failing other explanation, it may be asked if the decline of leprosy in Norway be not nearly connected with the practice of isolating the sick in the asylums erected for their use. These institutions, I would remark, were originally intended, by segregating apart the more vigorous lepers of both sexes, to aid in checking the propagation of disease through marriage; they were also meant to accommodate the worst cases, or those a burden to their friends; and to a minor extent they were to serve as hospitals for curative treatment. Though founded so far back as 1856, it has only of late become possible to estimate their influence over the general progress of this very chronic pest; and owing to the inevitable obstacles to correct registration alluded to in Part I., the data suitable for satisfactory analysis are still but limited. Dr. Hansen's observation in his quinquennial reports for 1875 and 1880 may, I think, be regarded as the earliest attempts scientifically made to determine the real effect of the isolation of lepers in a community: his main conclusions are summarized below. I have also considered the recorded opinion of preceding Norse physicians; and, on the whole, prefer the later view. In Part I. it is shown that leprosy is not declining simply by a process of dying out, but that there is continually taking place a certain reproduction of disease; and it is only when and where this last proceeds at a lesser rate than the death-loss that the pest can be said to be subsiding. A third condition, however, concurs; *viz.*, a contemporary removal from the districts and isolation in asylums of

many old and new cases of infection; and the question now arises, how does this isolating process influence the others? or these failing, itself account for the amendment proved in Part I.? Within the asylums there occurs a higher death-rate than outside, whilst in them no new cases can arise; on the other hand, in the country districts there obtains a lower death-rate, and here alone do new cases appear. The asylums serve as a means of partially evacuating the infected districts, abstracting particularly the worst examples of disease; and they are not necessarily, it might be said, otherwise concerned in the general progress of disease. But would such assertion be correct? Let it be agreed that to clearly comprehend the course of leprosy, attention must be directed to conditions obtaining in the districts; amongst which the chief one is the number of "new" cases which arise, proportionately to the total of "home-dwelling" sick: for if the accretion-rate of new cases exceed the death-rate of home-dwellers, then disease is on the increase; and *vice versa*. Now, in his report for 1875, Dr. Hansen shows that up to 1870, in only one easterly district had the death-rate exceeded the production-rate; whilst everywhere else the accretion-rate was highest. There had everywhere been removals to the asylums, and hence a diminution of the mortality outside these institutions: still, had no such emptying of the districts taken place the death-rate would nowhere, with the exception named (itself doubtless open to explanation), have exceeded the production-rate, and the total of lepers in the districts at the close of 1870 would in all probability have been quite as great as in 1856—or "in some places unquestionably greater." Elaborate tables are given, from which it appears that the yearly increment of new cases in a district regularly declines just according to the larger number of lepers removed to the asylums. Thus, *e. g.*, in Sogn-district, whilst these increments proportionately to the numbers living at home remain the same in 1856-60, 1861-65, and 1866-70, yet by removal to asylums, the numbers at home being continuously reduced, there has occurred a concomitant reduction of new cases, as shown in the successive yearly sums of 89, 64 and 59; which still display a definite and fixed ratio to the immediately preceding totals of home-dwellers. No exception to the above rule has been found; and from close and rigid scrutiny of the data alone, it seems clear that the diminution of new cases in the districts goes, *pari passu*, with the lessening number of home-dwelling sick: at least, amongst all the several data, no other relationship is so clear and inevitable as this one.

In his report for 1880, with matured statistics coming down to 1875, Dr. Hansen is not less emphatic; and finding a determinate ratio between the number of new cases, and the immediately preceding number of home-dwelling lepers in a district (taking 5-yearly periods for each), he employs such ratio to make a forecast of the future progress of leprosy in Norway. The particular data adduced in support of these views are certainly remarkable and seem to me adequate; they are, however, too elaborate for reproduction here.* Once more, it is shown that in Norway the proportionate growth of leprosy is by no means diminishing; and hence an inference that the conditions for extension of the disease, are in no way more unfavourably now than formerly. Since, therefore, the total of lepers is certainly lessening, this cannot be due to amendment (if any) in home-conditions; and the figures quoted are quite conclusive against the view that leprosy persists only as the result of ordinary mal-hygiene or a hurtful clime. In 1880, as previously, it is found that in the great majority of affected districts the death-rate of lepers lies below their increase-rate—the exceptions being one, or at most two, out of nine such districts; and as regards the other seven or eight, Dr. Hansen remarks the death-rate is so far below the production-rate, (*viz.*, from 2 to 6 per cent. lower,) that the condition of these localities would have been most grievous had there not taken place a large emptying of the sick thence into the Asy-

* Dr. Hansen's figures refer to separate districts in the total affected area. On analysis of column 3 (new cases) and column 7 (lepers at large) of the large table above, embracing the whole area, I find, after excluding the incomplete data of later years, that during the earlier years 1856-70 inclusive, the annual ratio between new cases and sick home-dwellers is, in the main, very near 1 to 10. This implies the yearly advent of 1 new case to every 10 lepers at large; which is a ratio larger than the mean death-rate of such lepers. Precise figures for the three included quinquennial periods, are successively as follows:—Mean annual number of lepers at large 2,371, of new cases 239: 1,994 and 204; 1,859 and 177. Subsequently to 1870, the ratio of new cases gradually declines; doubtless because their numbers have not yet been sufficiently ascertained. These data might have been introduced into the text of Part I., but they were reserved for this place as confirming the inference of Dr. Hansen, who does not, however, (that I see) state his estimate to be the same as that here independently elicited. Whilst well aware that several conditions must intervene, I am still of opinion that here is evidence of a quite definite influence; and I agree with Dr. Hansen that the Norwegian statistics contain no more constant *datum* than this one, of a distinct proportion between lepers at large and the newly-made lepers.

lums:—"Indeed, except Nordfjord, everywhere would the actual production-rate have been greater than ever before, without such prior isolation as has been available; and incomplete as this is and always has been, we may congratulate ourselves that it was practicable, and ought to feel grateful to those who by their zealous labours for the public weal have effected the establishment of the existing Asylums" (p. 18).

Briefly, analysis of the official statistics proves that the affected districts are becoming emptied of their sick, not by excess of deaths but by abstraction and isolation in Asylums and at home of many affected persons. Dr. Hansen also very reasonably adds that on the supposition of leprosy spreading by contagion, one can readily understand the disease may be subsiding generally, in spite of a sustained production-rate; since, consequent on removal to the Asylums and on isolation at home there must necessarily remain at large a smaller number of contagion-bearers capable of infecting the hitherto sound. Indeed, except upon the hypothesis of contagion, no other explanation of events seems possible.

Respecting the varying amount of disease, old and new, which prevails in individual areas, Dr. Hansen refers to the corresponding differences met with in abundance of the mild (smooth) and severe (nodular) forms of leprosis; showing in detail that where the worse form is commonest, there arise the largest proportion of new cases. Though somewhat recondite, this explanation I regard as probably valid.

SUMMARY OF PART II.

The amendment of public health under notice cannot be satisfactorily accounted for by reference solely to a general improvement in diet, dwellings, soil or climate; nor has purely medical treatment ever proved curative; and so far from leprosy in Norway showing a natural tendency to subside, there is ample evidence of a present activity equal to that displayed by the disease 25 years ago. Some influence might, therefore, be assigned to the special measure of isolating lepers; and, in point of fact, amongst all the available data, to none does amendment bear such definite relation—fixed or progressive—as it does to that lessening of lepers at liberty which results from the practice of enforced isolation. I admit that demonstration of such essential relationship is to be had only through a perfect acquaintance with every detailed instance adduced; yet with present information, I submit the evidence is enough to prove its reality, and

to indicate the true *modus operandi* of leper-isolation as practised in Norway. More than a single beneficial influence may, indeed, be at work ; but predominant is this exclusive dealing with the individual leper as himself the source of ill to others. So much being granted, it remains only to add that the transmission of personal ailment is necessarily effected either promptly by contagion, or slowly through communication to offspring—the intimate mode of transmission being essentially the same in either instance ; and here, Nowegian experience seems to indicate the usual predominance of contagion.

PART III.

PREVENTIVE MEASURES SUITABLE FOR INDIA.

Both social and humanitarian motives would inculcate the systematic relief of the leprous sick, whose malady to themselves is so grievous and abiding and to others so offensive or even hurtful. To all who recognise a claim thus founded, the experience patiently and not uncstly accruing in Norway must appear equally interesting and encouraging. Being scientifically acquired, the principles hereby evolved become applicable under conditions so widely diverse as those of Norway and India. First, as to country and clime, there is no reason whatever to suspect that leprosy anywhere differs in origin or nature, any more than it differs in signs, course of consequence ; and this consideration at once disposes of pre-conceivable objections to the best line of treatment being the same in both countries named. Analogy with other chronic diseases common to Europe and the East serves to confirm this view. Next, as to collateral circumstances, these are but subsidiary ; only in India the people being subject, more ignorant, apathetic and prejudiced, it is for their leaders and the ruling powers to initiate the needful preventive measures, and to uphold these until by spread of knowledge and experience of good effected the public approval becomes assured.

General treatment of the leprous as a peculiarly affected class may be either ordinary or stringent. Thus, the sick may be collec

and dealt with as ordinary hospital patients; without, that is, regard to prevention or future amendments. Or, for permanent relief, they should be strictly isolated from the rest of the community, and amongst themselves the sexes kept apart—isolation of this kind being practicable at the homes of lepers, but better carried out in asylums. Evidently, this last method is the only one likely to check and lessen disease: it has, in Norway, proved to be beneficial in both these directions, as well as by awakening the people to a sense of rational self-help and a willingness to co-operate further. Such a cogent and attractive stimulus is much needed in India, where the foundations of public hygiene have yet to be laid.

Segregation is practicable in three modes, either separately or combined:—

1.—By erecting plain asylums at certain centres, each of which would be a refuge common to several districts; and a place of detention, under due management and supervision.

2.—By founding Leper Colonies or village communities mainly of the affected, who, while allowed more liberty of movement, should yet be prevented from mingling with the peasantry around: hence still the need of strict supervision. Many spots would thus serve—such as deserted forts, decayed villages, and places now waste yet not far from other sources of supply, or not without near resources easily resuscitated.

3.—By requiring the strict isolation of leprous subjects retained in their homes at express wish of friends. Suitable separate lodgment would be indispensable; unsuitable shelter is even now sometimes supplied. Joining of such home-isolation with more public measures should not be overlooked; for to it experience in Norway seems to point as a means essential to complete success within a moderate period of time; and in India it would have to be still more largely resorted to.

For carrying out the above, in addition to funds, legislative authority is needed to take up the vagrant sick, to remove the sorely diseased who is insufficiently guarded at home, and at times to enforce continued isolation of the infected until medical sanction of liberty be granted. Such authoritative interference will, I am aware, be differently regarded by many and disliked by the masses: yet it cannot at present be dispensed with, and sufficient precedent exists in several British enactments against small-pox and contagious diseases of men and animals. Besides, as analogues, special insti-

tutions already exist for the permanently disabled, the blind and the insane ; also, in most civilized countries, for those incurable affected with cancer and consumption. At one time, indeed, asylums for lepers were common all over Europe, where now the disease generally has become eradicated ; whilst Norway still presents a number of these peculiar establishments, adapted to modern requirements, and, as I have tried to show, not less than formerly of decided efficacy.

APPENDIX.

NOTE ON THE PATHOLOGY OF LEPROSY.

I have long regarded this malady as one of the great chronic infective diseases of the human race; and such view I hold to be confirmed by Hansen's discovery that in leprous structures there is always to be found an algoid growth—a *bacterium*, which is absent from both healthy and differently diseased structures. In its fresh state I once saw this organism at Bergen (1873), and soon after at Bombay; and quite recently it has been repeatedly studied on the Continent of Europe. With the aid of new re-agents its presence is easily demonstrated; and I offer the appended illustration as an original one, corresponding closely with descriptions given of European specimens. In June last I excised a small 'nodule' from the arm of a leper; and after immediate hardening in alcohol made sections for double staining after Ehrlich's method. All these fragments show crowds of *bacilli* and several large collections of granules (? spores), which when untinted no doubt correspond to the "brown cells" figured as characteristic in Plate XII. of my large work on leprosy (London, 1874): besides, there are seen cells and nuclei belonging to the common tissues of the nodule. See Fig. 1. Here the patient was in fair health, the cutaneous eruption of several months standing, and quiescent or slowly subsiding. The minute organisms could not possibly have been accidentally introduced; their number is immense, and they seem to be growing actively, the products, doubtless, being eventually absorbed. As contrasted with the violent symptoms attending pathogenetic bacteria of acute infections, the little irritation, local or general, commonly attending *bacillus lepræ* is remarkable; yet occasional exacerbations of disease do occur, during which there is fever and wide reproduction of the nodules; and thus the general analogy of leprosis to syphilis and tuberculosis becomes apparent. European observers have found both bacilli and spores in lymphatic glands and the blood; also in diseased nerve-trunks, liver, spleen and testes: the evidence of systemic infection being then complete. It is known that the organism

will grow outside the body, and there is evidence that its germs (like those of tubercle) are freely given off from the persons of lepers; and by comparative experiment it is further ascertained that although general disease fails to appear, yet leprous material inoculated in animals slowly leads to a real—if imperfect—local reproduction of the leprous processes taking place in man. As systemic infection with a visible eruption occurs only at prolonged and irregular intervals in him, in the lower animals (themselves possibly less fit subjects) these intervals may be so long as to require a year, or more, for such outward manifestation. At present, proof of contagiousness of leprosy is mainly inferential; but further experiments may further positive data, like those now being acquired in the instance of tuberculosis, which so nearly resembles leprosis (*vide* large work, p. 176). This similitude holds good not only in a general clinical sense, but also as regards the attendant parasitic organism; and, in evidence, I have drawn some figures of the *bacillus tuberculosis* on the same scale as those of the lepra-growths: see Plate, Fig. 2. This second specimen was taken from the lung of a consumptive patient, who died in the J. J. Hospital: similar appearances have been seen in the sputa of other phthisical patients, and they correspond to English descriptions. The *b. lepræ* I find to be usually shorter and more variable in dimensions—length 1-16000 to 1-6000 in.; less bent, oftener bulging in centre and thinning at the ends; oftener dotted in aspect or composed of distinct granules in linear series, the number and site of which differ considerably. The amount of small rods and signs of spore-production greatly exceed what has been seen in tuberculated tissues; yet the general characters and processes appear much alike in both sets of specimens. Other particular features as shown in the drawings, made as accurately as possible with the aid of a 1-10 in. water-immersion lens, eye-piece B, and achromatic condenser of Swift.

(Signed) H. V. CARTER, M. D., (Lond.)

Bombay, November, 1883.

By order of His Excellency the Right Honourable the Governor in Council,

J. NUGENT, Secretary to Government.

LEPROSY IN OTHER COUNTRIES.

Answers to Questions Asked by the Hawaiian Government.

QUESTION 1.

1.—IS LEPROSY KNOWN IN.....? IF SO, BE PLEASED BRIEFLY TO DESCRIBE IT AS IT OCCURS THERE.

A.—ARE THERE SEVERAL DIFFERENT FORMS OR OUTWARD MANIFESTATIONS OF LEPROSY? IF SO, BY WHAT NAME ARE THEY RESPECTIVELY KNOWN?

B.—ARE THESE SEVERAL FORMS, IN YOUR OPINION, ONLY VARIETIES OF ONE COMMON MORBID STATE? OR ARE THEY SPECIFICALLY DISTINCT DISEASES, HAVING NO AFFINITY WITH EACH OTHER?

C.—PLEASE TO ENUMERATE SUCCINCTLY THE MORE OBVIOUS AND DISTINGUISHING CHARACTERS OF EACH FORM OF LEPROSY WHICH YOU HAVE SEEN.

REPLIES.

CANADA, (New Brunswick.)—It occurs there in the three parishes, Tracadie, Caraquet and Poukemouche which are situated on a peninsula between the Bay of Chaleurs and the Miramichi River.

- a. There are two forms; Tubercular and Anæsthetic Leprosy.
- b. These two forms are but varieties of a common morbid state.
- c. The tubercular form is distinguished by the presence of tubercles of various shapes and size which appear on the surface of the skin; most frequently on face. These tubercles enter atrophy or ulcerate.—DR. J. E. GRAHAM.

Leprosy is known in the two counties of Gloucester and of Northumberland, in the north-eastern part of the Province of New Brunswick, in Canada; that section of the country borders the Baie des Chaleurs, the Gulf of St. Lawrence and the lower portion of the River Miramichi.

Elephantiasis græcorum presents itself in New Brunswick precisely as it does everywhere else, as a chronic disease of a specific character. It is manifested externally by insensibility, maculæ and various extensive colorations of the skin, pemphigus, atrophy, alopecia

(not generalized), ulcers and ulcerations, small tumours (tubercles), adenic troubles, pyretic accesses, loss of extremities and other disorders, some of which are peculiar to the disease, and some simply concomitant lesions of more or less frequent occurrence in the course of the malady, the whole ending by suffocation, syncope, coma, marasmus or cachexia.

a. I have observed, in New Brunswick, what is meant by the words "tubercular leprosy" and "anæsthetic leprosy" of many authors, or by the words "phymatod leprosy," of other writers. What I have to say on this question applies also to other distinctions, made by not a few, under the various titles of "macular leprosy, *lepra mutilans*, "mixed leprosy," &c. All these classifications are based on the presence, absence or more or less conspicuous appearance of certain symptoms.

b. These so-called forms, in my opinion, are the result of one common morbid state.

Anæsthesia is invariably present, to a greater or lesser degree, in some part of the body, in all cases of leprosy; it is therefore difficult to understand how it can be made to characterise any particular form. It was from the consideration of the uniform presence of the analgesic state in some portion of the accessible surface of the body of the leper that the College of Physicians of London, in their report on leprosy, proposed to substitute the term "non-tuberculate" for the term "non-anæsthetic." Tubercles are often times absent; but inasmuch as those small tumours are only one of the manifestations of a process which affects, not simply the skin, but also the nerve structures and other tissues, the absence or presence of these papules, at a given moment or at any time, seems hardly sufficient to warrant an addition to the nomenclature. All this, however, is said without losing sight of the great importance of that symptom.

My answer to the second part of question b is easily surmised, from what I have already expressed. That which does not constitute, in my opinion, different forms of the distemper, cannot be for me "specifically distinct diseases, having no affinity with each other." Leprosy to my mind, is one indivisible morbid entity, so to speak, although, as in other ailments, its outward manifestations are not all produced in every case, and never to be all met together at a given moment, in the same individual. It is not, moreover, anæsthesia, maculæ, pemphigus, tubercles, destruction of substance,

which constitute *per se* the essence of leprosy; these trophic lesions are seen in other diseases; they succeed traumatism of the nerves; they are produced on animals by nervous irritation. What characterises the disease is the specific labor which produces them, in the particular way they present themselves in this affection—to the medical observer in shape, color, odor, mode of evolution—to the medical philosopher in analogies, differences, causes, effects logically deduced from evidence and history.

c. I have already given the more obvious characters of leprosy which I have seen; but I do not take any of them as distinguishing different forms of the disease. Most of the outward symptoms of leprosy are apt to be absent, to appear, disappear and reappear, succeeding and, as it were, supplanting each other, under the operation of one specific irritative force, during the long course of the sickness. I opine, with all due deference for the opinions of others, that such a succession and change of phenomena, all due to the same exciting agency, constitute a morbid unity, and cannot establish a basis upon which these forms can be built. To burden the study of the disease with such distinctions and names, is I humbly but firmly hold, complicating matters, without any adequate compensation, especially when attempts are made to carry these distinctions so far as to separately describe the progress of the disease throughout.—DR. J. C. TACHE.

Leprosy has existed in the Province of New Brunswick, Canada, for many years. It is a specific disease, characterized by the slow development of nodular growths in connection with the skin, mucous membranes and nerves, and in the latter case, by the supervention of anæsthesia, and a tendency to ulcerative destruction.

a. The tubercular and anæsthetic.

b. I agree with Dr. Taché in his statement that these are varieties of one morbid state.

c. The specific phenomena develop themselves according as the skin and mucous membrane on the one hand, or the nerves on the other, are principally affected; although in some cases all these tissues are implicated simultaneously or in succession.—DR. A. C. SMITH.

CANARY ISLANDS.—Yes, since the conquest. *Lepra tuberculosa* and *Lepra mutilans*. They are varieties of the same morbid condition and can be transmitted hereditarily.—DR. A. NAVARRO TORRENS.

CEYLON.—True leprosy is known in Ceylon and has been recognized since the Dutch occupation of the islands. It exists in every form and phase, the anæsthetic being perhaps the most frequent among the fish-eating population on the seaboard and in Colombo, the chief city of the island. It is considered a constitutional disease *sui generis*, and occurs in the principal forms, which, in my opinion, are only varieties of one common morbid state.—DR. W. R. KYNSEY.

GUATEMALA.—Yes; tuberculous, anæsthetic and one which is a combination of both of these. It is one and the same disease, with different symptoms.—DRS. VALLADORES AND YELA.

HONG KONG.—It does not prevail to any extent in this colony. There are cases amongst the lowest class of Chinese which, however, have not been treated by European practitioners.—CONSUL-GENERAL KESWICK.

MEXICO.—There is in Mexico a malady known as the “Mal de S. Lázaro,” the symptoms of which correspond with the disease commonly known under the name of *Elephantiasis Græcorum*, and which some European doctors have called leprosy. There are three forms, tuberculous, anæsthetic and macular. It is believed they are varieties of the same disease; they combine one with the other, two in one and the same individual.—DR. J. M. GOMEZ.

NETHERLANDS.—Leprosy occurs not only in the Netherlands but also in the East and West Indian Netherlands’ possessions. The disease presents itself in the three forms of maculosa, tubercular and anæsthetica. The persons in whom leprosy is observed in the Netherlands are such as have returned from the Indies. I have noticed unmistakeable symptoms of leprosy on such persons on landing and sometimes not till two years afterwards. In the East and West Indies leprosy is endemic but whilst the disease is of more frequent occurrence in the Moluccas than on the Island of Java, it is not epidemic in the latitudes first mentioned, the number of sufferers there being always very small.—DR. J. VAN DEVENTER.

NETHERLANDS, (Colonies.)—The disease appears in all parts of the Indian Archipelago except the little Sunder Islands and the northern part of Celeb, also in Surinam and Curaao.—COLONIAL MINISTER.

(2) (Holland.)—Leprosy is rare in the Netherlands, and even then is almost invariably seen in persons coming from the colonies. Isolated cases are known in which the disease is hereditary.—S. EGGELING.

NORWAY.—Yes, there are two different forms of leprosy known by the names of *glat spedalskhed* (glet smooth spedalskhed leprosy) *Elephantiasis lavis* and kindred spedalskhed, (kindred knotty cumyry), *Elephantiasis tuberculosa*. These two forms are varieties of the same disease and are often found in the same person; the disease beginning with one form and afterwards developing to the other.

E. Lavis—spots, (maculæ) of various sizes and shapes of a reddish-purple color and often combined with the loss of feeling (anæsthesia).

E. Tuberculosa, knots or lumps (tuberculæ) of the size of a pea to a spanish nut, sometimes spread over various parts of the body, sometimes confluent to larger masses, especially in the eyebrow and other parts of the face.—CONSUL-GENERAL.

SIAM.—Leprosy prevails but little in Siam, more so amongst the Chinese than Siamese population.—CONSUL KURTZHALSS.

SPAIN.—Leprosy is rare in Spain and generally presents itself endemically and in the tuberculous form.—THE FACULTY. BARCELONA.

QUESTION 2.

2.—AT WHAT AGE DOES THE DISEASE GENERALLY MANIFEST ITSELF, AND WHAT ARE USUALLY THE EARLIEST SYMPTOMS OBSERVABLE?

REPLIES.

CANADA, (New Brunswick.)—May appear at any age; in Tracadie as young as eight, and as old as eighty. The earliest symptoms are generally debility, pain in the limbs and occasionally fever, and general feeling of malaise. The appearance of maculæ is generally the earliest possible sign.—DR. J. E. GRAHAM.

The disease generally manifests itself after puberty, in grown up adults and middle-aged individuals; but it comes at almost all ages; early infancy, however, seems to be entirely exempt from the malady. Children are not frequently attacked by leprosy, and it is rarely observed to begin in old age.

The incipient symptoms are general uneasiness, drowsiness, irrepressible instinctive anxiety, undefined and not very severe pains,

followed by hyperæmia, hyperæsthesia, insensibility, maculæ, pemphigus, atrophic manifestations and alopecia, especially of the eyebrows.—DR. J. C. TACHE.

When resident physician I admitted boys of eight years of age, and one woman who was a septuagenarian. The disease, however, is chiefly confined to young adults.

The premonitory symptoms often continue for a long period, and may include lassitude and depression, accompanied by a constant inclination to sleep, even when at work; then follow pains in different parts of the body simulating rheumatism, and in turn followed by a train of symptoms described by Dr. Taché in his reply to this question.—DR. A. C. SMITH.

CANARY ISLANDS.—Between infancy and manhood and sometimes even in infancy.—DR. A. N. TORRENS.

CEYLON.—At all ages from childhood to advanced life. I have not seen children born with the disease but have observed anæsthetic leprosy in a child of three years, and well-marked tubercular leprosy in children of nine and eleven years. There is at present a female inmate in the asylum who has clearly manifested the disease in her fifty-seventh year, long after her two sons were affected with it.

The earliest symptoms in the anæsthetic form are usually indicative of some nerve lesion as shooting or darting pains in the limbs, loss of morbidity of the fingers, burning sensations in the feet, formication all over the body followed some time after by loss of cutaneous sensibility, contraction of the little fingers and the appearance of tawny colored, benumbed spots on the face, trunks and limbs.

In the tubercular form the premonitory symptoms generally observed are a feeling of malaise, unusual drowsiness, vertigo, epastaxis, profuse sweating on the least exertion, the appearance of livid blotches attended with rigors, and tumefaction and thickening of the lobes of the ears.

In well-marked mixed-leprosy, the fever and erythematous rash are generally associated with commencing numbness of the fingers or a benumbed discolored patch on the body and the occurrence of blebs on the extremities.—DR. W. R. KYNSEY.

GUATEMALA.—The disease is most frequently met with between the age of twenty and forty. I have met with only two patients of tender age, one of six and one of seven years of age, but I have heard of two or three cases where the afflicted were twelve to fifteen years of age.—DRS. VALLADARES AND YELA.

MEXICO.—It generally appears from seven to thirty years of age, but there are cases in which it has appeared at forty and fifty. The first symptoms are, ordinarily, a cessation of the transpiration of the perspiration of the feet and legs with increased sweat on the rest of the body, dryness in the nasal fossæ and falling of the external part of the eyelids. Accompanying these phenomena are a burning sensation in the members and body and a little anæsthesia.—**DR. J. M. GOMEZ.**

NETHERLANDS.—Leprosy shows itself among children as well as among adults. In the Indies the disease may last for five years then it ends fatally. In the Netherlands it continues much longer up to fifteen years.—**DR. J. VAN DEVENTER.**

NORWAY.—The disease generally manifests itself in the mature age, but appears also in children. The earliest symptoms are usually, a change in the person's temper and mind; a change in the features of the face and then the appearance of maculæ or tubercula.—**CONSUL-GENERAL.**

SPAIN.—Lepers have presented themselves from twenty to forty years of age.—**THE FACULTY. BARCELONA.**

QUESTION 3.

3.—AT WHAT PERIOD OF LIFE, AND WITHIN WHAT TIME, DOES THE DISEASE USUALLY ATTAIN ITS FULL DEVELOPMENT? AND AT WHAT PERIOD OF LIFE, AND AFTER WHAT TIME, DOES IT USUALLY PROVE FATAL?

REPLIES.

CANADA, (New Brunswick.)—The disease usually develops in three or four years. It usually proves fatal in seven or eight years.—**DR. J. E. GRAHAM.**

The period of life at which the disease attains its full development and at which it proves fatal, depends on the period at which it has made its first appearance, combined with the length of its sickness. The progress and duration of the malady vary very considerably: in some cases it destroys its victims in a few years, in other cases it lasts many years, and in a few cases a long period of time. I have not

yet sufficiently worked the problem to attempt to give an average, inasmuch as many considerations are to be had in the discrimination of the facts from which it would be logical to strike a fair mean. Women seem to be possessed of a greater power of resistance to the disease than men. Nine to twelve years are not an uncommon duration in both sexes. There are instances of such a slow progress and of such an attenuated malignity of the ailment that life, and even general fair health, are enjoyed for many years. There are now living, in the Lazaretto of New Brunswick, two women who have had leprosy with a constant show, although at times somewhat obscure, of the characteristic symptoms, for the respective periods of at least forty-six and thirty years. In these two cases there are yet no signs observed of a profoundly impaired health, far less of a near destruction. A woman died a few days ago who had had the disease for twenty-two years.

The development of leprosy can hardly be subjected to a regular exposition of stages, so capricious is it in its manifestations and duration; many of its symptoms are susceptible of complete disappearance and re-appearance as already stated. The ailment may be said to be in full development when some of its pathognomonic symptoms, and the process by which they are produced, are clearly discernable. I am led to believe that the time of invasion is to be counted by months, during which, and a long time after, the patient may ignore, or knowing, may conceal his situation, if he chooses to do so. As there are no sure rules to indicate the phases of the disease, this obscurity, and the circumstances of the benignity of the first symptoms and of the persistency of the incipient trouble through the whole course of the sickness, have induced to assign an excessive length for the stage of invasion, that is, for that period of languor which is premonitory to the outward signs of the disease.

Leprosy, however, may be said, *grosso modo*, to present three periods subsequent to the prodromic phases:—1st, the progressive period; 2nd, the sickly period; 3rd, the destructive period. The first may last a very long time, and may include series of pretty severe manifestations; the second may indure for months or years, and offer frequent intermissions of accesses and comparative repose; the third is of comparatively short duration, which may, nevertheless, mean more than a year.

This division, which I venture, and the names I give to its periods are suggested to me by the character of the disease, its degrees

being in reality, susceptible of distinction only when measured by the general results on the whole system.—DR. J. C. TACHE.

This depends on the age and constitutional vigor of the individual. The duration of the anæsthetic variety seems to be much longer than that of the tubercular. In New Brunswick as elsewhere, an essential feature in its life history is its extreme chronicity.—DR. A. C. SMITH.

CANARY ISLANDS.—It generally reaches its full development at adolescence. It commonly terminates in death at the adult age or in incipient old age.—DR. A. NAVARRO TORRENS.

CEYLON.—The disease attains its full development sooner or later, according to the circumstances and condition of the patient and the state of his general health. From 10 to 15 years is about the usual period; rarely the disease remains normally arrested for years. It usually proves fatal at middle age; the longest duration of the disease recorded in the asylum for the tubercular form was 16 years, anæsthetic, 28 and mixed, 21 years.—DR. W. R. KYNSEY.

GUATEMALA.—The development of the disease has no fixed time; the younger the patient, the more rapid the progress of the disease. As a rule, the disease terminates fatally in from four to eight years.—DRS. VALLADARES AND YELA.

MEXICO.—The greater number of cases occur in youth or at a mature age. The diseased who suffer from the macular form die within ten years, counting from the date of the appearance of the disease; those from the tuberculous within fifteen, and those with the anæsthetic may linger for thirty years or more.—DR. J. M. GOMEZ.

NETHERLANDS.—In the Indies it may last for five years and in the Netherlands for fifteen before its fatal termination.—DR. J. VAN DEVENTER.

NORWAY.—The disease attains its full development in the mature age.—CONSUL-GENERAL.

SPAIN.—Cases are too few in number to form any exact opinion.—THE FACULTY BARCELONA.

QUESTION 4.

4.—IS THE DISEASE MORE FREQUENT IN ONE SEX THAN IN THE OTHER?
IF SO, IN WHAT PROPORTION?

REPLIES.

CANADA, (New Brunswick).—The disease is as frequent in the male as in the female sex.—DR. J. E. GRAHAM.

Leprosy is more frequent in men than in women. The proportion is not constant; it varies considerably from time to time, and evidently, from place to place; but there can be no doubt that the greater prevalence of leprosy among men than among women is one of the features of the disease.—DR. J. C. TACHE.

It is much more frequent in the male.—DR. A. C. SMITH.

CANARY ISLANDS.—I believe it is equally frequent in both sexes.—DR. A. NAVARRO TORRENS.

CEYLON.—This disease appears more often in men than in women in the proportion, based on the figures in the records of the asylum, of eight to one.—DR. W. R. KYNSEY.

GUATEMALA.—Amongst men. Nine men to six women.—DRS. VALLADARES AND YELA.

MEXICO.—More frequent in the masculine sex in the proportion of eight to five.—DR. J. M. GOMEZ.

NORWAY.—No.—CONSUL-GENERAL.

SPAIN.—Apparently more frequent in males.—THE FACULTY. BARCELONA.

QUESTION 5.

5.—IS IT MORE FREQUENT AMONG CERTAIN RACES? AMONG THE WHITE, THE COLORED, OR THE BLACK POPULATION? AND IN WHAT RELATIVE PROPORTIONS?

REPLIES.

CANADA, (New Brunswick).—Not confined to any particular race.—DR. J. E. GRAHAM.

It is historically proved that the disease attacks all races. In

New Brunswick there have been lepers of French, Scotch, English and Irish descent, and lepers of mixed origin. I have had no occasion to personally observe the existence of the malady in other races, as there are none, or hardly any, of other blood in the counties of Gloucester and Northumberland than the four mentioned, except Indians. The frequency of the disease does not, in my opinion, depend on race, but is proportionate to the exposure of the people to the causality of propagation.

By far the greatest number of lepers in New Brunswick is counted among the French and the people of mixed origin, and for many years past the malady was, and is, exclusively limited to these two categories. The disease has become endemic only in five localities, namely:—Tracadie, Nigaoek, Pokmouche, Chipagan and Carquette, in which the French population is to all others as nine to one. There never was any case of leprosy among the Indians, although one of their principal villages is located in the endemic section, being contiguous to the parish of Nigaoek.—DR. J. C. TACHE.

The disease is at present confined to persons of French descent. In former years several persons of other nationalities have been affected, doubtless through contagion.—DR. A. C. SMITH.

CANARY ISLANDS.—I have only seen it in individuals of the white or Caucasian race.—DR. A. NAVARRO TORRENS.

CEYLON.—In this colony it is not exclusively confined to any community, but is more frequently observed among the Sinhalese and Tanils. Seldom among the Eurasians, and more rarely among Europeans.—DR. W. R. KYNSEY.

GUATEMALA.—It is an almost unheard of thing for an Indian to be afflicted with leprosy; my patients have all been Ladinos. (Descendants of Spaniards and Indians).—DRS. VALLADORES AND YELA.

MEXICO.—No preference of this disease has been noted for any special race or color; except, it may be stated, that no negro with this disease has yet presented himself at this hospital.—DR. J. M. GOMEZ.

NETHERLANDS.—Leprosy is found equally amongst Europeans, Chinese, Arabs and native Indians.—DR. J. VAN DEVENTER.

NORWAY.—There is no colored population.—CONSUL-GENERAL.

QUESTION 6.

6.—IN WHAT CONDITION OF SOCIETY IS THE DISEASE OF MOST FREQUENT OCCURRENCE, AND WHAT ARE THE CIRCUMSTANCES WHICH SEEM TO FAVOR ITS DEVELOPMENT IN INDIVIDUALS, OR IN GROUPS OF INDIVIDUALS?

PLEASE TO ENUMERATE THESE CIRCUMSTANCES UNDER THE FOLLOWING HEADS:—

A.—THE CHARACTER OF THE PLACE OR DISTRICT WHERE THE DISEASE MOST FREQUENTLY OCCURS IN RESPECT OF ITS BEING URBAN OR RURAL, ON THE SEA-COAST OR INLAND, LOW, DAMP, AND MALARIAL, OR HILLY AND DRY.

B.—THE SANITARY CONDITION OF THE DWELLINGS, AND OF THEIR IMMEDIATE NEIGHBORHOOD.

C.—THE HABITS OF LIFE, AS TO PERSONAL CLEANLINESS OR OTHERWISE.

D.—THE ORDINARY DIET AND GENERAL WAY OF LIVING.

E.—THE OCCUPATION OR EMPLOYMENT.

 REPLIES.

CANADA, (New Brunswick.)—It is of most frequent occurrence among people whose dwellings are small and unhealthy and whose food is poor in character. In Tracadie stale fish is eaten freely.

a. It occurs frequently on the sea-coast and low, damp countries.

b. In Tracadie sanitary condition bad; dwellings small and unhealthy.

c. Not cleanly. Lazy and slovenly.

d. Diet: potatoes, salt meat and stale fish; very little change of diet.

e. Farmers, fishermen.—DR. J. E. GRAHAM.

The disease in New Brunswick, has occurred among the ordinary working classes of varied means, none of the families in which it has been met being in affluence and none in misery, all being provided with the necessaries of life. The circumstances which favor the development of leprosy, in individuals, are the close intimacy of family life and the great sociability of the people.

a. The places where the malady has occurred are rural, with one exception; all the places are upon the sea-coast or in close proximity to it. The interior of the counties of Gloucester and Northumberland is not settled. The country is undulating, generally dry, well-drained, well-provided with good water and not at all malarial.

b. The sanitary condition of the dwellings vary, and do not differ in their variety from those of the neighboring parishes, counties and provinces similarly situated. The dwellings of many of the affected families are good and well-disposed, others are not. The conditions of the immediate vicinity of the houses are very good as a rule.

c. The habits of life are those generally met with among people of the same class and following the same occupations. The domestic and personal cleanliness vary; some are clean and some are not.

d. The diet has always been good and abundant. The way of living, so far as it affects the moral and the physic of people, is better described by the results than by fanciful or prejudiced descriptions; the population is well-behaved, intelligent, laborious, remarkably healthy, robust and long lived; they are not subject to any widely prevalent disease of any kind. The natural increase of population, among these people, is exceptionally great.

e. The ordinary occupations are farming, by far the most important, fishing and lumbering, and a mixture of them. All lepers have been from families connected with these occupations except one merchant, one the daughter of a miller and a few who belonged to the class of artisans.

Several families were and are reduced, some very much, in circumstances, on account of the existence of leprosy in their midst; the malady was, or is, the cause of the poverty, not the poverty of the malady.

I have said before that the Indians have been the only race, of those inhabiting these localities in any number, which have remained, so far, exempt from leprosy; it is well, then, to recite the conditions of their existence as connected with the purport of the question I am now answering. The places in which the Indians dwell bear precisely the same character as those inhabited by their neighbors, among whom the ailment has exercised its ravages. The occupations of these aborigines are farming, on a very small scale indeed, fishing, hunting, lumbering and cognate interests; these people are provided with the necessities of life; they are well-behaved, intelligent and uncommonly healthy, although not generally long lived; they are much more subject to scrofula and consumption than all the other races, and have no great power of resistance to sickness, as a rule; they do not increase in number; their dwellings with few exceptions, are very poor, much inferior, save such exceptions, to

the very worst houses of the white population. In one word, their circumstances are, at best, equal and generally inferior to those of the poorer whites. The only reason I can see for the complete immunity they have enjoyed is that although friendly with the other races, they do not socially come in close intercourse or contact with them. Every race, as a rule, keeps the closest company with their own blood, and the most intimate social relations are seen with the French amongst themselves.—DR. J. C. SMITH.

During my residence in Tracadie, I observed that the disease appeared only among the poorer class. In one of my reports, I stated that “as the condition of the people improved, bringing with it a more nourishing diet, the disease would eventually disappear.” Poverty, *per se*, cannot cause the disease, but, because of the depressing influence, it seems to favor its development in persons *who are predisposed to it by hereditary taint*.

I fully agree with Dr. Taché in his statement that “the circumstances which favor the development of leprosy are the close intimacy of family life and the great sociability of the people.”

a. Tracadie is on the sea-coast.

b. The people are settled on farms; consequently, the dwellings are isolated and healthy.

c. The habits of life are good. The people are religious and marry young.

d. There is now abundance of healthy food to be obtained. The indolent ones are, of course, the poorer ones, and their diet is seldom wholesome. I have frequently noticed that when such persons are ill from serious disease they readily succumb.

e. Fishing and farming.—DR. A. C. SMITH.

CANARY ISLANDS.—Sea-coast, and city and country, indiscriminately, having at all times different conditions of soil. This diversity in the dwellings of lepers is in obedience, in my judgment, more to a conjunction of special circumstances than that the localities favor the development of the disease, owing to the fact that it is not a common thing for them to leave the towns in which they originally established themselves, on account of the horror their miserable appearance inspired strangers to them, thus perpetuating in the places referred to, leprosy by heredity. I do not desire to be understood, by this observation, that I do not believe it to be possible for leprosa to be spontaneous—since several cases of it have been recorded—but the rather to accentuate the importance which, in my opinion, heredity holds.

b. The dwellings belonging to the poorer classes are generally unhealthy.

c. Ordinarily, they have little personal cleanliness.

d. The food usually consists of salted fish, baked or roasted; maize roasted and ground into flour, which they eat in great quantities dry or kneaded with water, milk or herb broth; also baked potatoes and several kinds of vegetables.

e. Some are fishermen but the greater part laborers.

Among the predisposing causes are the severe changes of temperature, and the abrupt checking of sweat by sudden plunges into the water.—DR. A. NAVARRO TORRENS.

CEYLON.—Chiefly among the poorer classes such as cultivators or field laborers, mechanics, cartdrivers, coolies or day laborers, fishermen and others whose occupation expose them to vicissitudes of weather and extremes of heat and cold.

It occurs more frequently on the western and southern sea-board of the island and in Colombo, the chief city; on the banks of rivers and littoral lakes, in low, more or less damp malarial localities.

Sanitation is not much observed among the poorer natives, whose dwellings are usually small thatched huts, ill-ventilated and crowded, with the immediate neighbourhood filthy and strewn with mouldy and rotten vegetation and excremental deposits; their clothing deficient; their diet poor from insufficiency of nitrogenous elements, consisting chiefly of dry and salted or badly preserved fish, often in a rotten state, and inferior grain and vegetables; and their occupation that of cultivators or coolies.—DR. W. R. KYNSEY.

GUATEMALA.—On the sea-coast which is low, and in the department of Quezaltenango, which lays 6,000 feet above the level of the sea, and which is the coldest region of this republic, leprosy is but little seen. Near the capital, where the climate is very variable, is the spot where leprosy most exists.

b. The dwellings are generally of adobe; brick tiled.

c. People of the lowest class, who live on the cheapest kind of food and give no attention to cleanliness.

d. Plantains, bananas, black beans, fried in lard. Work only when necessity compels them.

e. Farm hands.—DRS. VALLADARES AND YELA.

MEXICO.—It afflicts almost entirely the poorer classes and generally such persons as frequently expose themselves to moisture and heat alternately.

a. It is most frequent in small populations and in the country, in places near to the coast, in the bays and in moist and marshy spots.

b. The condition of the dwellings may have some influence.

c. The habit of taking considerable alcohol appears to influence the development of the disease in persons predisposed to it.

d. The larger number of cases are noted where pork is freely used for food.

e. The lazars are mostly herders, out-door men, or laborers who are for the best part of their lives close to a fire and frequently exposed to the cold air and dampness.—Dr. J. M. GOMEZ.

NETHERLANDS.—It is more prevalent on the sea-boards than in the mountain ranges. Dr. J. VAN DEVENTER.

NORWAY.—Nearly only amongst the poorer classes.

a. The disease appears only along the sea-coast and its immediate neighbourhood. The district is mostly hilly, rocky and dry. Malaria is not known in Norway.

b. The sanitary condition of the dwellings is, as a rule, good.

c. The personal cleanliness is not always as good as it ought to be.

d. The ordinary diet is fish—often salt or dried, but seldom or never rotten, potato and porridge, prepared of barley-meal and water.

e. Fishermen, sailors and small farmers.—CONSUL-GENERAL.



QUESTION 7.

7. —WHAT CONDITION OR CIRCUMSTANCES OF LIFE SEEM TO ACCELERATE OR AGGRAVATE THE DISEASE WHEN IT HAS ONCE MANIFESTED ITSELF IN AN INDIVIDUAL?

REPLIES.

CANADA, (New Brunswick.)—Previously mentioned condition.—Dr. J. E. GRAHAM.

There are no conditions nor circumstances of life that seem to accelerate or aggravate *per se* the disease, beyond what applies to all ailments. Everything calculated to depress the moral or physi-

cal forces renders the individual sick less able to resist the ravages of this malady, and, therefore, quickens its development and its fatal termination; but the idea that the eating of a particular article of food, the use or non-usage of certain articles of habiliment, can influence the production and spread of leprosy, is in my humble opinion, quite inadmissible. There are no more reasons, that I see, to attribute the disease to, or connect it with climate, dwellings, food or habits of life, than there is as regards small-pox, syphilis, measles and other universal distempers, specific in their character; of course crowding, and all which favours close contact, necessarily multiply the risks of contagion and infection for all specific diseases, as well as isolation is a preventive against the spread of such ailments. I cannot take up here the question of common (not banal) causes possibly being factors in the spontaneous elaboration of viruses, nor can I here enter into the study of the theory of micro-organisms in connection with specific diseases.—DR. J. C. TACHE.

Similar to Dr. Taché's.—DR. A. C. SMITH.

CANARY ISLANDS.—I know of no others than the lack of hygiene.—DR. A. NAVARRO TORRENS.

CEYLON.—Insanitary and unhygienic conditions associated with intemperance, sexual excesses, neglect and exposure; want of personal cleanliness; improper treatment by native practitioners and the abuse of mercury and opium. Most of the patients admitted into the hospital with the disease in its most aggravated form had been previously salivated or were habitual opium eaters.—DR. W. R. KYNSEY.

GUATEMALA.—Want of fresh air; the custom (amongst the poor class) of whole families sleeping in one room; want of cleanliness, and use of alcoholic liquors.—DRS. VALLADORES AND YELA.

MEXICO.—Abuses of all kinds; excess in eating and drinking, exposure to intense and cold encourage the symptoms of the disease and hasten its fatal termination.—DR. J. M. GOMEZ.

NORWAY.—Drunkenness and want aggravate the disease.—CONSUL-GENERAL.

QUESTION 8.

8.—DOES THE DISEASE APPEAR OFTEN TO BE HEREDITARY? HAVE YOU KNOWN INSTANCES WHERE ONE MEMBER ONLY OF A FAMILY HAS BEEN AFFECTED WHILE ALL THE OTHER MEMBERS REMAINED FREE FROM ANY TRACE OF IT?

REPLIES.

CANADA, (New Brunswick.)—It is apparently hereditary. It is doubtful as to whether it is really hereditary.—DR. J. E. GRAHAM.

The disease does not appear to me to be hereditary, that is transmitted, *de toutes pieces*, from parents to offspring by procreation, or stored in the blood of individuals or generations, in its morbid nature and potential energy, without show of its presence. I doubt not, however, that the greater or lesser susceptibility to contract or acquire the distemper forms part of constitutional inheritance. Families may have received from parents and ancestors innate organic peculiarities, which render their members, or some, or many of them, not necessarily, but eventually, easier preys to the disease, when the exciting cause is brought, with effective force, to act upon them.

I know many instances where one member only of a family has been affected with leprosy, while all the other members remained free from any trace of it. In this connection, it is not idle talk to remark that the mere fact of the appearance of several cases of a disease in one family is, *prima facie*, no more suggestive of hereditary than of contagious transmission. The significance of the occurrence is a matter of medical and philosophical criticism, which has to consider the character of the malady, the order of time, and the circumstances and surroundings of each case.—DR. J. C. TACHE.

I am unable to adduce *proofs* of the hereditary nature of the disease, but hold that the theories of *hereditary transmission* and *contagion* are not incompatible. The disease frequently skips over a generation. I have known many instances where one member only of a family was affected.—DR. A. C. SMITH.

CANARY ISLANDS.—Hereditariness figures principally as the predisposing cause from first to last.—DR. A. NAVARRO TORRENS.

CEYLON.—A hereditary taint is frequently admitted by the patients in the asylum and several instances are on record of one or two members of a family being affected while others remain exempt from any trace of the disease.—DR. W. R. KYNSEY.

GUATEMALA.—Yes; I think it is often hereditary, but I know of three instances; two of which, in which the father, and one in which the mother were afflicted with leprosy. They cohabited and the children are not diseased, but in one case the daughter's child had it. I am convinced that the disease will appear in the second generation.—DRS. VALLADORES AND YELA.

MEXICO.—It is hereditary, and is assuredly transmitted by the mother: but if the mother is healthy it has not yet been determined how it is transmitted. I know a family in which only one of its members has any symptoms of the anæsthetic form; the family consists of four persons. The father died of the disease, the mother is healthy.—DR. J. M. GOMEZ.

NETHERLANDS.—In the few Indian Islands set apart for the treatment of lepers, the sufferers are living together. These lepers produce perfectly healthy children, out of whom are sometimes born leprous infants. This proves the hereditary tendency of leprosy at least in the form of atavism.—DR. J. VAN DEVENTER.

NORWAY.—The disease is very often hereditary. Yes, have known such instances.—CONSUL-GENERAL.

SIAM.—The Siamese as well as the Chinese assert that the disease is hereditary but not catching, and are therefore not afraid of being near a leper.—CONSUL KURTZHALSS.

QUESTION 9.

9.—HAVE YOU REASON TO BELIEVE THAT LEPROSY IS IN ANY WAY DEPENDENT ON, OR CONNECTED WITH SYPHILIS, YAWS, OR ANY OTHER DISEASE?

REPLIES.

CANADA, (New Brunswick.)—It is not connected with syphilis.—DR. J. E. GRAHAM.

Leprosy is certainly neither dependent on nor connected with syphilis. It cannot be dependent on any other malady, it being a specific disease, quite distinct, therefore, from all other distempers. A leper may become syphilitic as he may become phthisical, he may catch small-pox as he may catch the itch; he may die from any inter-

current ailment, as he may be killed by accident; equally, in such and other similar cases, the event is not of leprosy, but in addition to it. There never was any trace of syphilitic affection discovered in any of the lepers in New Brunswick; small-pox never happened among them; the itch made its appearance in the Lazaretto on few occasions.—DR. J. C. TACHE.

I have no reason to suspect that leprosy in any way depends on, or is connected with any other disease;—it is a disease *sui generis*.—DR. A. C. SMITH.

CANARY ISLANDS.—I do not believe that leprosy has any relation with the other affections called syphilitic, scrofulous or eruptive.—DR. A. NAVARRO TORRENS.

CEYLON.—I have sometimes found it connected with scrofula, syphilis and parang; but have no reason to believe that it is in any way dependent on these diseases. Leprosy also occurs associated with scabies, eczema, psoriasis and other diseases among the fish-eating population of the islands. I have seen it in connexion with *Elephantiasis Arabum*.—DR. W. R. KINSEY.

GUATEMALA.—I know of only one leper, who was syphilitic before being attacked with leprosy; my other patients have had no syphilis. I have observed that a mercurial treatment aggravates the disease.—DRS. VALLADARES AND YELA.

MEXICO.—I do not believe this disease has any connexion with syphilis. Anti-syphilitic treatment breaks down.—DR. J. M. GOMEZ.

NETHERLANDS.—It cannot be proved that leprosy is in any correlation with such other diseases as syphilis, *framboesia*, etc.—DR. J. VAN DEVENTER.

NORWAY.—No.—CONSUL-GENERAL.

QUESTION 10.

10.—HAVE YOU MET WITH INSTANCES OF THE DISEASE APPEARING TO BE CONTAGIOUS, IN THE ORDINARY SENSE OF THAT TERM, *i. e.*, COMMUNICATED TO HEALTHY PERSONS BY DIRECT CONTACT WITH, OR CLOSE PROXIMITY TO DISEASED PERSONS?

A.—IF SO, IN WHAT STAGE WAS THE MALADY IN THE DISEASED PERSON? WERE THERE ULCERATIONS WITH A DISCHARGE?

B.—PLEASE TO DESCRIBE BRIEFLY THE CASE OR CASES OF CONTAGIOUS COMMUNICATION WHICH YOU HAVE SEEN YOURSELF.

C.—DOES THE DISEASE SEEM TO BE TRANSMISSIBLE BY SEXUAL INTERCOURSE?

 REPLIES.

CANADA, (New Brunswick.)—Have known of cases, but have not seen any.

c. It is communicable by sexual intercourse.—DR. J. E. GRAHAM.

I am aware of many instances of the disease appearing to be contagious, in the ordinary sense of that term; I mean instances in which heredity cannot be invoked and in which contagion is the only cause capable to reasonably account for the propagation of the malady. The typical character of leprosy, the category to which it consequently belongs in the nosological table, its general history and what I have ascertained in New Brunswick leave no doubt in my mind about the contagiousness of the disease. I firmly believe it is communicable from the diseased to the healthy. I do not think, from what I have observed, that proximity, no matter how close, nor mere touch, can convey the contagion. In my opinion, there must be an adequate contact of some kind, mediate or immediate, of course, with an individual susceptible of contracting the malady, and, at the time, so circumstanced as to be in a situation to receive it. I hold contagion as the cause of the *propagation* of the disease; and in so saying I do not lose sight of the fact of the occasional spontaneous *production* of leprosy; *importation*, of course, means contagious spreading into one country, when it extends beyond immigrants sick, and their descendants.—DR. J. C. TACHE.

I have not met with instances of the disease of which I could affirm that they had been communicated by diseased persons; but I am convinced that leprosy is contagious, although not to the extent of other contagious disease. The people of the leprous district

intermarry very freely, and it is difficult to exclude hereditary taint. But I am confident that in former years persons free from hereditary taint contracted the disease, while living in Tracadie.—DR. A. C. SMITH.

CANARY ISLANDS.—I do not know of any case of contagion of leprosy by means of contact, more or less direct,—including sexual intercourse.—DR. A. N. TORRENS.

CEYLON.—It is not considered contagious in Ceylon. It is, in my opinion, not contagious as syphilis, parang, or the exanthematous diseases. There is no conclusive evidence in the hospital records of communicability by direct contact with, or close proximity to diseased persons. It certainly does not appear to be transmissible by sexual intercourse.—DR. W. R. KYNSEY.

GUATEMALA.—I have not. I think it is transmissible by sexual intercourse.—DRS. VALLADORES AND YELA.

MEXICO.—There is not a single case of contagion either direct or through proximity to the disease. There has been no case of transmission of the disease by sexual intercourse.—DR. J. M. GOMEZ.

NETHERLANDS.—Not one case of contagion has ever been recorded. In some families though both parents are pure Europeans, and had never been in India before, one of many children was seized with leprosy without any assignable cause.—DR. J. VAN DEVENTER.

NETHERLANDS, (Colonies.)—In the East Indies they think that leprosy is not contagious, and in the West Indies that it is. The natives in the Netherlands Indies are indifferent in regard to the disease.—COLONIAL MINISTER.

Leprosy in the only forms in which we see it in the Netherlands is not transmitted from one person to another, except as hereditary disease.—DR. EGELING.

NORWAY.—No.—CONSUL-GENERAL.

SIAM.—The prevalent opinion as to the contagiousness of leprosy is that the disease is not catching. I have many times seen families sitting together, or people crowded in a public gambling or other house amongst whom was a leper and no notice was taken of him.—CONSUL KURTZHALSS.

SPAIN.—Have been unable to observe any case of contagion, but it must be taken into account that the malady has not presented itself under any other form than the endemic.—THE FACULTY. BARCELONA.

QUESTION 11.

- 11.—ARE PERSONS AFFECTED WITH LEPROSY PERMITTED IN * * * * *
TO COMMUNICATE FREELY WITH THE REST OF THE COMMUNITY? OR
IS THERE ANY RESTRICTION IMPOSED, OR SEGREGATION ENFORCED,
IN RESPECT TO THEM?

REPLIES.

CANADA, (New Brunswick.)—In Tracadie they are kept in a lazaretto, but they have liberty to see their friends.—DR. J. E. GRAHAM.

Persons affected with leprosy are segregated in New Brunswick, and do not communicate freely with the rest of the community when the existence of the disease is fully ascertained, and their entry in the Lazaretto has been secured; there has been, however, a few accidental exceptions to this rule; I do not speak here of the occasional visits of relatives and friends, which are allowed under certain restrictions.

For years past the segregation has not been enforced by violent measures, but the exertions, particularly on the part of the clergy, to induce the sick to enter the Lazaretto have been unceasing, and the result has been that for many years all lepers, with only two exceptions that I know for certain, have resorted to the Lazaretto and have remained there till death, or are there yet. The two exceptions are of one girl, who a few years ago, went abroad, and of one married woman, who, after a very short sojourn in the Lazaretto, was taken out by her husband and died at home. It was only in 1844 that a lazaretto was established, there were no means before to isolate the lepers; for some years after several lepers died out of the Lazaretto.

The difficulties of early removals, apart from the painful severance of family ties, apply to cases in which the labor or services rendered by the lepers are still of great importance for their families. It would be almost a necessary complement to the establishment of Lazarettos to provide some little means to lessen such difficulties when they do occur.—DR. J. C. TACHE.

It is not at all times easy to secure prompt removal of affected persons to the lazaretto, but once admitted, segregation is complete and permanent.—DR. A. C. SMITH.

CANARY ISLANDS.—The law places no obstacles in the way of marriage between lepers; there exists no other obstacle to a union of

such except the repugnance inspired in the minds of the healthy by their appearance.—DR. A. NAVARRO TORRENS.

CEYLON.—There is no restriction imposed or segregation enforced by legislative enactment or otherwise in respect of lepers in this colony. A partial restriction is perhaps observed among the home-dwellers in villages.—DR. W. R. KYNSEY.

GUATEMALA.—No: they are strictly segregated. Refers to Question 8.—DRS. VALLADORES AND YELA.

MEXICO.—Those sick from the disease, of both sexes, are placed in different wards.—DR. J. M. GOMEZ.

NETHERLANDS.—At one time, when leprosy was held to be infectious, persons afflicted with the disease both in the Netherlands and the colonies were isolated either in special institutions or even on certain islands dedicated for that purpose. Now-a-days such isolation has ceased to exist, no restriction being put upon the leper's liberty. Only in cases of *lepra mutilans* is the patient avoided on account of his unsightly appearance. In the Netherlands persons attacked with leprosy are admitted to the common hospitals, where they are ranged by the side of other patients.—DR. J. VAN DEVENTER.

Previous to the year 1865 there were in the Netherlands East Indies local and provincial regulations enforcing separation for lepers. In 1868, however, because it was thought to be proved after long experience that leprosy must be considered to be not contagious, it was determined on part of the Government that there was no reason for forcing the lepers to separate themselves in the hospitals or dwell in retired places. In the West Indies where the disease is considered to be contagious separation is carefully enforced. Persons suspected of this disease who go among the public are arrested by the police and thereupon examined by a special medical committee. If they are found to be infected they are sent to the establishment set apart for the purpose. In the Colony of Surinam they go a step further by removing infected persons to the asylum even if they have not gone among the public.—COLONIAL MINISTER.

Leprosy has not been the subject of special legislation in the Netherlands as there was no reason for it. A long time ago, driven through insufficiently grounded fear, some lepers were transported from Brombeck to Vreenhuisen and there forcibly segregated.—DR. EGELING.

NORWAY.—Yes. The only restriction is that when lepers are so poor, that they want public support, they are obliged to seek it in public asylums, and are not supported in their homes in the parishes as other poor.—CONSUL-GENERAL.

SIAM.—The Government of Siam does not enforce segregation of lepers, but there exist certain temples here, the priests of which specially devote themselves to attending to paupers and lepers by supplying them with food and allowing them to camp on the premises of the temple.—CONSUL KURTZHALSS.

SPAIN.—Communication between lepers and healthy persons is not restricted in Spain.—THE FACULTY. BARCELONA.

QUESTION 12.

12.—WHAT PUBLIC PROVISION IS MADE FOR THE RECEPTION AND TREATMENT OF THE LEPROUS POOR? ARE THEY ADMITTED INTO THE GENERAL HOSPITALS? OR, ARE THERE SEPARATE INFIRMARIES OR ASYLUMS PROVIDED FOR THEM? PLEASE TO DESCRIBE THE STRUCTURAL AND SANITARY CONDITIONS OF SUCH BUILDINGS AND THE ARRANGEMENTS MADE FOR THE MEDICAL AND HYGIENIC TREATMENT OF THE SICK IN THEM.

REPLIES.

CANADA, (New Brunswick.)—A separate infirmary is provided by the Government.—DR. J. E. GRAHAM.

An institution, supported at the public expense, is provided for the lepers, where these unfortunates are under the care of Sisters of Charity, ministered by a chaplain and visited by a physician. The leprous sick are not sent to general hospitals.—DR. J. C. TACHE.

Dr. A. C. Smith refers to Dr. Taché's reply.

CANARY ISLANDS.—In the hospital (Las Palmas de Gran Canaria) there is no compulsory segregation, but voluntary. It is only when the lepers dedicate themselves to medical treatment that the authorities compel them to be secluded.—DR. A. NAVARRO TORRENS.

CEYLON.—An asylum has been in existence prior to the commencement of the present century. It is wholly supported by the Government at an annual cost to the colony of Rs 15,400.—DR. W. R. KYNSEY.

MEXICO.—There was formally a special hospital but now the lazars occupy wards in a civil hospital.—**DR. J. M. GOMEZ.**

NETHERLANDS.—The old leper houses in the Netherlands have long been converted into hospitals for chronic diseases, but in the pauper (?) colonies of Ommerschans and Vreenhuisen there is a shed or special ward affording accommodation for twelve persons; though as a rule not more than six beds are occupied.—**DR. J. VAN DEVENTER.**

(Colonies.)—In the East Indies there yet existed in 1865 fourteen asylums for lepers, but, in consequence of the regulation of that year, eight of them were gradually abolished. The six which still exist serve for voluntary asylums for lepers. In Surinam there exists one asylum for lepers; in Curaçao three. In the East India hospitals there were 189 lepers at the end of 1883 and in the West Indian 144.—**COLONIAL MINISTER.**

No, unless Vreenhuisen is considered such.—**EGELING.**

NORWAY.—There are public asylums where all lepers that seek admittance are received free; in these asylums marriage, of course, is prohibited and the two sexes kept apart. Lepers are also admitted into general hospitals, but then only when suffering from other disease.—**CONSUL-GENERAL.**

SIAM.—No royal or private hospitals or asylums for lepers exist in Siam as far as my informants and myself are aware of.—**CONSUL KURTZHALSS.**

SPAIN.—The hospital, which, in Barcelona, is designed for lepers, contains two wards, one for men and the other for women, together with accessory departments, and is a branch of the Hospital-General of the Holy Cross.—**THE FACULTY. BARCELONA.**

QUESTION 13.

13.—CAN YOU STATE THE NUMBER OF LEPROUS PERSONS MAINTAINED AT THE PUBLIC EXPENSE IN.....?

REPLIES.

CANADA, (New Brunswick.)—About 24 or 25.—**DR. J. E. GRAHAM.**

The number of inmates in the Lazaretto on the 15th May, 1885, was twenty-two, of whom one, a girl, is not a leper; she is afflicted with lupus. Of these twenty-one lepers, eleven were men, and ten women. The annual grant is \$3,200, and includes the small remuneration of the chaplain, the indemnity of the visiting physician, the allowance to the sisters and the wages and board of two servants.—DR. J. C. TACHE.

The number at the close of 1884 was twenty-two.—DR. A. C. SMITH.

CANARY ISLANDS.—At the present time there are fifty-four in the Las Palmas Hospital, twenty-three males and thirty-one females; forty-seven having the tuberculosa form.—DR. A. NAVARRO TORRENS.

CEYLON.—The daily average of lepers in the asylum maintained by the Government for the last year was one hundred and twenty-five.—DR. W. R. KYNSEY.

GUATEMALA.—Nine men and six women.—DRS. VALLADORES AND YELA.

MEXICO.—Ordinarily there are thirty patients in the two wards.—DR. J. M. GOMEZ.

SPAIN.—From four to ten a year.—THE FACULTY. BARCELONA.

NORWAY.—In 1880, six hundred and seventeen in Public Asylums.—CONSUL-GENERAL.

QUESTION 14.

14.—HAVE YOU REASON, FROM PERSONAL KNOWLEDGE, TO BELIEVE THAT THE DISEASE HAS BEEN OF LATE YEARS,—SAY DURING THE LAST 15 OR 20 YEARS.—ON THE INCREASE * * * * OR OTHERWISE? AND IF SO, PLEASE TO STATE WHAT IN YOUR OPINION MAY HAVE CONTRIBUTED TO ITS INCREASE OR ITS DIMINUTION.

REPLIES.

CANADA, (New Brunswick.)—Somewhat on the decrease.—DR. J. E. GRAHAM.

Since the establishment of a lazaretto, in 1844, leprosy has been, more or less, kept in check in New Brunswick, and for several years

past, especially during the last few years, it has undergone a notable diminution. The check and the decrease are in ratio of the more or less prompt resort to the lazaretto; segregation is, in my opinion, the cause of the diminution of the disease.—DR. J. C. TACHE.

It is on the decrease. At one time there were nearly forty inmates of the lazaretto. To the improving condition of the people, *and the segregation of those affected*, I attribute the diminution.—DR. A. C. SMITH.

CANARY ISLANDS.—I believe that the disease is diminishing in direct correspondence with the improved condition of the poorer classes.—DR. A. NAVARRO TORRENS.

CEYLON.—The disease, I have reason to believe, has decidedly increased since 1862. I have no doubt that a certain reproduction of the disease is going on whatever the factors are at work, and that the proportionate growth of leprosy in the colony is by no means diminishing.—DR. W. R. KYNSEY.

GUATEMALA.—The disease has increased in Central America, because the lepers were not, until lately, segregated and members of families known to have leprosy were allowed to marry; while it is a known fact, that although the son or daughter of a leper may bear no visible traces of this disease, the grand children are sure to be leprous.—DRS. VALLADORES AND YELA.

MEXICO.—This malady has been known in Mexico from the time of the Conquest, since Herman Cortés founded a hospital especially for the lazars. As regards the increase or decrease of this disease there has been no noticeable change.—DR. J. M. GOMEZ.

SPAIN.—The disease appears destined to disappear from the people with the advance of civilization and the assiduous cultivation and perfecting of the practices of hygiene.—THE FACULTY. BARCELONA.

NORWAY.—The disease is diminishing yearly. The higher civilization, better sanitary habits and the Public Asylums contribute to the diminution. The known number of lepers was, in 1856, 2,113; 1860, 2,068; 1870, 2,055; and 1880, 1,606.—CONSUL-GENERAL.

QUESTION 15.

15. —WHAT RESULTS HAVE YOU OBSERVED FROM THE HYGIENIC, THE DIETETIC, OR THE MEDICINAL TREATMENT OF THE DISEASE? DOES LEPROSY UNDERGO A SPONTANEOUS CURE? AND IF SO, AT WHAT STAGE OF THE DISEASE? ARE YOU AWARE WHAT PROPORTION OF THE LEPROUS POOR TREATED AT THE PUBLIC EXPENSE IN * * * * RECOVER WHOLLY OR PARTIALLY?

REPLIES.

CANADA, (New Brunswick.)—No good results from medical treatment. Much may be done by attending to the general health of patients.—DR. J. E. GRAHAM.

The results I have observed from good hygienic and dietetic treatment are that the influence of the disease is lessened and life is prolonged. This has been rendered very apparent of the Lazaretto, especially since the year 1880, that the buildings were made more ample and comfortable, other improvements were provided for, and the entire management of the dietary was transferred to the care of the sisters, from the former direction of a functionary who was called keeper-cook. Those beneficial results of good sanitary measures are, nevertheless, only a respite of a few years at best.

The various and multiplied attempts made at different times, in New Brunswick, by medical men, or under medical guidance, to cure the disease, have all failed, as have also failed several empiric methods and vaunted medicines.

Remedial attendance to common functional disorders, palliative treatment of the painful manifestations of leprosy, and attentive nursing of the patients, although no cure, are, nevertheless, highly beneficial, and are constantly resorted to at the New Brunswick Lazaretto.

I have never seen a spontaneous cure of leprosy; nor has there been any, so far, in New Brunswick.—DR. J. C. TACHE.

As the result of long observation, I am convinced that good hygienic measures, including a regular system of healthy diet, has great power in checking rapid progress in the disease—life is thereby prolonged.

I have never observed more than a temporary amelioration from any medicinal treatment, and only such as might be attributed to the influence of the mind over the body. My predecessor used colored water—accompanied by strong assurances of benefit there-

from, and in every instance found a temporary improvement, equal in degree to any apparent benefit he found from the use of medicinal agents. I know of no spontaneous cure of the disease, although I know instances of temporary abeyance of the disease, lasting, in some cases, during a considerable period.—DR. J. C. SMITH.

CANARY ISLANDS.—I have not seen any positive and evident case of a radical cure by medical treatment. I believe that leprosy is incurable (at least in the two forms which I have studied). But it sometimes happens that the evolution of the disease is arrested leaving the patient for a considerable time in a condition very compatible with health. Without denying that medical treatment can materially contribute to this condition I consider that dieting is of great efficacy.—DR. A. N. TORRENS.

CEYLON.—No treatment as yet has been found of any permanent benefit. The best results have been obtained from hygienic and dietetic treatment alone.

There is at present in the asylum a Malabar patient in general good health, admitted with anæsthetic leprosy, in whom the disease had been fully developed, whose case may be considered as a spontaneous cure; no further symptoms having appeared during the last six years, the disease having apparently exhausted itself. I cannot confidently assert that any patients have recovered under treatment but have been benefitted.—DR. W. R. KYNSEY.

GUATEMALA.—Lepers should have plenty of fresh air, wear flannel clothing, bathe every day in tepid water, eat roast meat, thick soups and milk. I have never seen or heard of leprosy undergoing a spontaneous cure; of my patients in the hospital, two were partly cured in the third stage, and one radically in the second stage. The two former anæsthetic and the latter one tuberculous.—DRS. VALLADARES AND YELA.

MEXICO.—The only favorable results obtained have been an alleviation of the sufferings of the sick. Hygienic measures are very useful and necessary. Nitrogenous food and the deprivation of all alcoholic beverages have also been found beneficial, and with regard to the medicinal treatment, outside of the systematic, I have only noted any decided improvement when the sick have been treated by the sudorific method. I have never seen a spontaneous cure of this malady. During 12 years at this hospital not a single case has been restored to health except one who subsequently died.—DR. J. M. GOMEZ.

NETHERLANDS.—The therapeutic as well as the dipterocarpic method of treating the disease have hitherto been ineffectual. In the case of a child Dr. Van der Star saw a case of leprosy yield, but atrophy of the skin and stenosis set in. On other parts of the body the blotches disappeared but atrophy of the skin remained.—**DR. J. VAN DEVENTER.**

NORWAY.—In 1880, of the 617 lepers in the Public Asylums, 7 recovered. From 1857 to 1879, 102 are known to have recovered.—**CONSUL-GENERAL.**

SPAIN.—A great number of medicines have been tried to combat this disease but, in almost all cases, without result, except that the iodic treatment internally and externally appears to have done some good. The patients are afforded a good hygienic and dietetic regimen, allowed to walk around, are kept in perfect cleanliness of body and supplied with healthy food and of good quality.—**THE FACULTY. BARCELONA.**

QUESTION 16.

16.—WHAT IS THE ESTIMATED POPULATION OF.....? AND WHEN WAS THE LAST CENSUS TAKEN?

IS THERE A GENERAL AND UNIFORM REGISTRATION OF BIRTHS AND DEATHS, INCLUDING THE CAUSES OF DEATH? AND IF SO, HOW LONG HAS SUCH A REGISTRATION EXISTED?

REPLIES.

CANADA, (New Brunswick.)—The population of the whole Province of New Brunswick, according to the last census, was, on the 4th April, 1881, 321,233 souls. The population of the county of Gloucester was 21,614, and the population of the county of Northumberland 25,109. There is a uniform registration of births and deaths, but it is not general, being only carried on among the Catholic population; it does not, however, include the causes of death.—**DR. J. C. TACHE.**

CEYLON.—February 17th, 1881, the population was 2,759,738. There is a uniform registration of births and deaths, including the causes of deaths, existing since 1867, kept at the office of the Registrar-General.—**DR. W. R. KINSEY.**

GUATEMALA.—Republic, 1,400,000, of which two-thirds are full blood Indians. Capital, 60,000 last year. Yes; since eleven years ago.—**DRS. VALLADORES AND YELA.**

NORWAY.—1,851,438. The last census was taken December 31st, 1875, for the Provinces; in Christiana every year there is a general registration of births and deaths including the causes of death. Such a registration has been kept up for centuries.—**CONSUL-GENERAL.**

QUESTION 17.

17.—CAN YOU STATE THE NAME OF THE TOWNSHIPS OR DISTRICTS IN WHICH LEPROSY PREVAILS MOST, AND GIVE THE NUMBER OF LEPEBS AND THE POPULATION IN EACH OF SUCH TOWNSHIPS OR DISTRICTS?

REPLIES.

CANADA, (New Brunswick.)—Leprosy has made its appearance in the town of Chatham, in the parishes of Nelson, of Northesk and of Alnwick, in the county of Northumberland, and in the parishes of Saumarez, of Inkerman, of Chipagan and of Caraquette, in the county of Gloucester.

NAMES OF LOCALITIES.	Population, 1881....	Lepers in Lazaretto, 1885	Lepers Outside, 1885	Total Lepers, 1885..
Tracadie	2,819	13	2	15
Pokmouche.....	1,804	4	..	4
Chipagan	2,322	3	..	3
Caraquette	3,837	..	1	1
Nigaouek	* 2,646	1	..	1

* This is the total population of Alnwick, of which about 200 are to be added to Tracadie, about 500 to other circumscriptions, leaving the balance to the ecclesiastical parish of Nigaouek.—**DR. J. C. TACHE.**

CEYLON.—In the Western Province including Colombo, the chief city of the Islands, with a population of 897,329, and the Southern Province, including the township of Galle, with a population of 433,520. Leprosy is very infrequent in the hilly districts of the central and is but rarely observed in the other Provinces of the Island.—**DR. W. R. KYNSEY.**

REPORTS ON LEPROSY.

Enquiry Made by the Hawaiian Government.

CANADA, NEW BRUNSWICK.

ANSWERS TO THE INTERROGATORIES SUBMITTED BY HIS EXCELLENCY THE
MINISTER OF FOREIGN AFFAIRS OF THE KINGDOM OF HAWAII,
THROUGH MR. C. ELLIOTT ANDERSON, HAWAIIAN CON-
SUL-GENERAL IN CANADA.

Answers of Mr. J. C. Taché, M. D. & L. D., Titulary Professor of the Laval University, Knight of the Legion of Honour, Deputy Minister of Agriculture, and of Dr. A. C. Smith, M. D. & C. M., Member of the Medical Council of New Brunswick, Visiting Physician of the Tracadie Lazaretto.

OTTAWA, June, 1883.

Mr. Taché's answers:—

A. 1.—Leprosy is known in the two counties of Gloucester and of Northumberland, in the north-eastern part of the Province of New Brunswick, in Canada; that section of the country borders the Baie des Chaleurs, the Gulf of St. Lawrence and the lower portion of the River Miramichi.

Elephantiasis græcorum presents itself in New Brunswick precisely as it does everywhere else, as a chronic disease of a specific character. It is manifested externally by insensibility, macule and various extensive colourations of the skin, pemphigus, atrophy, alopecia (not generalised), ulcers and ulcerations, small tumours (tubercules), adenic troubles, pyretic accesses, loss of extremities and other disorders, some of which are peculiar to the disease, and some simply concomitant lesions of more or less frequent occurrence in the course of the malady, the whole ending by suffocation, syncope, coma, marasmus or cachexia.

a. I have observed, in New Brunswick, what is meant by the words "tubercular leprosy" and "anæsthetic leprosy," of many authors, or by the words "phymatod leprosy" and "aphymatod leprosy," of other writers. What I have to say on this question applies also to other distinctions, made by not a few, under the various titles of "macular leprosy," *lepra mutilans*, "mixed leprosy," &c. All these classifications are based on the presence, absence or more or less conspicuous appearance of certain symptoms.

b. These so-called forms, in my opinion, are the result of one common morbid state.

Anæsthesia is invariably present, to a greater or lesser degree, in some part of the body, in all cases of leprosy; it is therefore difficult to understand how it can be made to characterise any particular form. It was from the consideration of the uniform presence of the analgesic state in some portion of the accessible surface of the body of the leper that the College of Physicians of London, in their report on leprosy, proposed to substitute the term "non-tuberculate" for the term "anæsthetic."

Tubercles are often times absent; but inasmuch as those small tumours are only one of the manifestations of a process which affects, not simply the skin, but also the nerve structures and other tissues, the absence or presence of these papules, at a given moment or at any time, seems hardly sufficient to warrant an addition to the nomenclature. All this, however, is said without losing sight of the great importance of that symptom.

My answer to the second part of question b is easily surmised, from what I have already expressed. That which does not constitute, in my opinion, different forms of the distemper, cannot be for me, "specifically distinct diseases, having no affinity with each other." Leprosy, to my mind, is one indivisible morbid entity, so to speak, although, as in other ailments, its outward manifestations are not all produced in every case, and never to be all met together at a given moment, in the same individual. It is not, moreover, anæsthesia, maculæ pemphigus, tubercles, destruction of substance, which constitute *per se* the essence of leprosy: these trophic lesions are seen in other diseases; they succeed traumatism of the nerves; they are produced on animals by nervous irritation. What characterises the disease is the specific labour which produces them, in the particular way they present themselves in this affection—to the medical observer in shape, colour, odour, mode of evolution—to the

medical philosopher in analogies, differences, causes, effects logically deduced from evidence and history.

c. I have already given the more obvious characters of leprosy which I have seen; but I do not take any of them as distinguishing different forms of the disease. Most of the outward symptoms of leprosy are apt to be absent, to appear, disappear and reappear, succeeding and, as it were, supplanting each other, under the operation of one specific irritative force, during the long course of the sickness. I opine, with all due deference for the opinions of others, that such a succession and change of phenomena, all due to the same exciting agency, constitute a morbid unity, and cannot establish a basis upon which these forms can be built. To burden the study of the disease with such distinctions and names, is, I humbly but firmly hold, complicating matters, without any adequate compensation, especially when attempts are made to carry these distinctions so far as to separately describe the progress of the disease throughout.

A. 2.—The disease generally manifests itself after puberty, in grown-up adults and middle-aged individuals; but it comes at almost all ages: early infancy, however, seems to be entirely exempt from the malady. Children are not frequently attacked by leprosy, and it is rarely observed to begin in old age.

The incipient symptoms are—general uneasiness, drowsiness, irrepressible instinctive anxiety, undefined and not very severe pains, followed by hyperæmia, hyperæsthesia, insensibility, maculæ, pemphigus, atrophic manifestations and alopecia, especially of the eyebrows.

A. 3.—The period of life at which the disease attains its full development and at which it proves fatal, depends on the period at which it has made its first appearance, combined with the length of the sickness. The progress and duration of the malady vary very considerably: in some cases it destroys its victims in a few years, in other cases it lasts many years, and in few cases a long period of time. I have not yet sufficiently worked the problem to attempt to give an average, inasmuch as many considerations are to be had in the discrimination of the facts from which it would be logical to strike a fair mean.

Women seem to be possessed of a greater power of resistance to the disease than men. Nine to twelve years are not an uncommon duration in both sexes. There are instances of such a slow progress and of such an attenuated malignity of the ailment that life, and

even general fair health, are enjoyed for many years. There are now living, in the Lazaretto of New Brunswick, two women who have had leprosy with a constant show, although at times somewhat obscure, of the characteristic symptoms, for the respective periods of at least forty-six and thirty years. In these two cases there are yet no signs observed of a profoundly impaired health, far less of a near destruction. A woman died a few days ago who had had the disease for twenty-two years.

The development of leprosy can hardly be subjected to a regular exposition of stages, so capricious is it in its manifestations and duration; many of its symptoms are susceptible of complete disappearance and reappearance, as already stated. The ailment may be said to be in full development when some of its pathognomonic symptoms, and the process by which they are produced, are clearly discernable. I am led to believe that the time of invasion is to be counted by months, during which, and a long time after, the patient may ignore, or, knowing, may conceal his situation, if he chooses to do so. As there are no sure rules to indicate the phases of the disease, this obscurity, and the circumstances of the benignity of the first symptoms and of the persistency of the incipient trouble through the whole course of the sickness, have induced to assign an excessive length for the stage of invasion, that is, for that period of langour which is premonitory to the outward signs of the disease.

Leprosy, however, may be said, *grosso modo*, to present three periods subsequent to the prodromic phases: 1st, the progressive period; 2nd, the sickly period; 3rd, the destructive period. The first may last a very long time, and may include series of pretty severe manifestations; the second may indure for months or years, and offer frequent intermissions of accesses and comparative repose; the third is of comparatively short duration, which may, nevertheless, mean more than a year.

This division, which I venture, and the names I give to its periods are suggested to me by the character of the disease, its degrees being, in reality, susceptible of distinction only when measured by the general results on the whole system.

A. 4.—Leprosy is more frequent in men than in women. The proportion is not constant; it varies considerably from time to time, and, evidently, from place to place; but there can be no doubt that the greater prevalence of leprosy among men than among women is one of the features of the disease.

A. 5.—It is historically proved that the disease attacks all races. In New Brunswick there have been lepers of French, Scotch, English and Irish descent, and lepers of mixed origin. I have had no occasion to personally observe the existence of the malady in other races, as there are none, or hardly any, of other blood in the counties of Gloucester and Northumberland than the four mentioned, except Indians. The frequency of the disease does not, in my opinion, depend on race, but is proportionate to the exposure of the people to the causality of propagation.

By far the greatest number of lepers in New Brunswick is counted among the French and the people of mixed origin, and for many years past the malady was and is exclusively limited to these two categories. The disease has become endemic only in five localities, namely: Tracadie, Nigaouek, Pokmouche, Chipagan and Carquette, in which the French population is to all other origins as nine is to one. There never was any case of leprosy among the Indians, although one of their principal villages is located in the endemic section, being contiguous to the parish of Nigaouek.

A. 6.—The disease, in New Brunswick, has occurred among the ordinary working classes of varied means, none of the families in which it has been met being in affluence and none in misery, all being provided with the necessities of life. The circumstances which favour the development of leprosy, in individuals and in groups of individuals, are the close intimacy of family life and the great sociability of the people.

a. The places where the malady has occurred are rural, with one exception; all these places are upon the sea-coast or in close proximity to it. The interior of the counties of Gloucester and Northumberland is not settled. The country is undulating, generally dry, well-drained, well-provided with good water and not at all malarial.

b. The sanitary conditions of the dwellings vary, and do not differ in their variety from those of the neighbouring parishes, counties and provinces similarly situated. The dwellings of many of the affected families are good and well-disposed, others are not. The conditions of the immediate vicinity of the houses are very good as a rule.

c. The habits of life are those generally met with among people of the same class and following the same occupations. The domestic and personal cleanliness vary; some are clean and some are not.

d. The diet has always been good and abundant. The way of

living, so far as it affects the moral and the physic of people, is better described by the results than by fanciful or prejudiced descriptions; the population is well-behaved, intelligent, laborious, remarkably healthy, robust and long-lived; they are not subject to any widely prevalent disease of any kind. The natural increase of population, among these people, is exceptionally great.

e. The ordinary occupations, are farming, by far the most important, fishing and lumbering, and a mixture of them. All lepers have been from families connected with these occupations except one merchant, one the daughter of a miller and a few who belonged to the class of artisans.

Several families were and are reduced, some very much, in circumstances, on account of the existence of leprosy in their midst; the malady was or is the cause of the poverty, not the poverty of the malady.

I have said before that the Indians have been the only race, of those inhabiting these localities in any number, which have remained, so far, exempt from leprosy; it is well, then, to recite the conditions of their existence as connected with the purport of the question I am now answering. The places in which the Indians dwell bear precisely the same character as those inhabited by their neighbours, among whom the ailment has exercised its ravages. The occupations of these aborigines are farming, on a very small scale indeed, fishing, hunting, lumbering and cognate industries; these people are provided with the necessities of life; they are well-behaved, intelligent and commonly healthy, although not generally long-lived; they are much more subject to scrofula and consumption than all the other races, and have no great power of resistance to sickness, as a rule; they do not increase in number; their dwellings, with few exceptions, are very poor, much inferior, save such exceptions, to the very worst houses of the white population. In one word, their circumstances are, at best, equal, and generally inferior to those of the poorer whites. The only reason I can see for the complete immunity they have enjoyed is that, although friendly with the other races, they do not socially come in close intercourse or contact with them. Every race, as a rule, keeps the closest company with their own blood, and the most intimate social relations are seen with the French amongst themselves.

A. 7.—There are no conditions nor circumstances of life that seem to accelerate or aggravate *per se* the disease, beyond what

applies to all ailments. Everything calculated to depress the moral or physical forces renders the individual sick less able to resist the ravages of this malady and, therefore, quickens its development and its fatal termination; but the idea that the eating of a particular article of food, the use or non-usage of certain articles of habilitation, can influence the production and spread of leprosy, is, in my humble opinion, quite inadmissible. There are no more reasons, that I see, to attribute the disease to, or to connect it with, climate, dwellings, food or habits of life, than there is as regards small-pox, syphilis, measles and other universal distempers, specific in their character; of course crowding, and all which favours close contact, necessarily multiply the risks of contagion and infection for all specific diseases, as well as isolation is a preventive against the spread of such ailments. I cannot take up here the question of common (not banal) causes possibly being factors in the spontaneous elaboration of viruses, nor can I here enter into the study of the theory of micro-organisms in connection with specific diseases.

A. 8.—The disease does not appear to me to be hereditary, that is transmitted, *de toutes pieces*, from parents to offspring by procreation, or stored in the blood of individuals or generations, in its morbid nature and potential energy, without show of its presence. I doubt not, however, that the greater or lesser susceptibility to contract or acquire the distemper forms part of constitutional inheritance. Families may have received from parents and ancestors innate organic peculiarities, which render their members, or some, or many of them, not necessarily, but eventually, easier preys to the disease, when the exciting cause is brought, with effective force, to act upon them.

I know many instances where one member only of a family has been affected with leprosy, while all the other members remained free from any trace of it. In this connection, it is not idle talk to remark that the mere fact of the appearance of several cases of a disease in one family is, *prima facie*, no more suggestive of hereditary than of contagious transmission. The significance of the occurrence is a matter of medical and philosophical criticism, which has to consider the character of the malady, the order of time, and the circumstances and surroundings of each case.

A. 9.—Leprosy is certainly neither dependent on nor connected with syphilis. It cannot be dependent on any other malady, it being a specific disease, quite distinct, therefore, from all other distempers.

A leper may become syphilitic as he may become phthisical ; he may catch small-pox as he may catch the itch ; he may die from any intercurrent ailment, as he may be killed by accident ; equally, in such and other similar cases, the event is not of leprosy, but in addition to it. There never was any trace of syphilitic affection discovered in any of the lepers in New Brunswick ; small-pox never happened among them ; the itch made its appearance in the Lazaretto on few occasions. Only two lepers are known to have died from intercurrent diseases : one, a girl, from phthisis ; the other, a man, from pleurisy. Of course, the invasion of an accompanying chronic ailment may be anterior or posterior to the development of leprosy in the individual. In the case alluded to, of the phthisical girl, phthisis showed itself in the course of leprosy, and exercised over the latter affection a decided revulsive and depurative action.

A. 10.—I am aware of many instances of the disease appearing to be contagious, in the ordinary sense of that term ; I mean instances in which heredity cannot be invoked and in which contagion is the only cause capable to reasonably account for the propagation of the malady. The typical character of leprosy, the category to which it consequently belongs in the nosological table, its general history and what I have ascertained in New Brunswick leave no doubt in my mind about the contagiousness of the disease. I firmly believe that it is communicable from the diseased to the healthy. I do not think, from what I have observed, that proximity, no matter how close, nor mere touch, can convey the contagion. In my opinion, there must be an adequate contact of some kind, mediate or immediate, of course, with an individual susceptible of contracting the malady, and, at the time, so circumstanced as to be in a situation to receive it. I hold contagion as the cause of the *propagation* of the disease : and in so saying I do not lose sight of the fact of the occasional spontaneous *production* of leprosy ; *importation*, of course, means contagious spreading into one country, when it extends beyond immigrants sick, and their descendants.

There is a case, the facts of which are established beyond possibility of cavil, in which the disease appears to me, as well as it did to those who witnessed it, to have been produced by the absorption of liquid matter discharged from the body of a woman who had died in a cachectic state from leprosy. At the funeral of that woman the body was carried (according to a then long-standing custom, which has been since abandoned on account of what, I am now

reciting) on the shoulders of four strong young men. The day was hot, and, on a sudden, liquid matter began to ooze out through a joint of the coffin, wetting the shoulder of one of the carriers. The wet, combined with the heat and the pressure of the sharp edge of the coffin, produced an abrasion of the skin of the young man. The contact of the liquid matter with the abraded surface lasted a part of the time of the procession and the whole length of the service, as it was only on his return home that the young man washed his sore shoulder and changed his clothing. Some months after, that man, whose health had always been robust, began to feel unwell; in a short time the symptoms of leprosy made their appearance, and he died of the disease eleven years after the occurrence. There had never been any case of leprosy in his family, whose ancestral genealogy is traced for several generations back; in fact, the disease was not yet known as leprosy, being of recent appearance in the locality and among these people; he was the fourth case in that place, the three others being the woman spoken of, the husband and the sister of the woman, in the ancestry of whom there had never been, neither; any trace of the disease; the fifth case in that locality was the sister of that young man. The woman's husband and sister had the disease a few years before her death, and the young man's sister a few years after the commencement of the disease in her brother.

a. The woman spoken of had ulcerations, with abundant discharge, at the time of her death. This would be a case of the well-known survivance or posthumous persistency of the malignity of virulent matter.

b. I have not seen, myself, any case of contagious communication, if by that is meant the eye-witnessing of the application of the contagium, whatever that may be, followed by the development of the disease. I have never tried to inoculate or otherwise produce leprosy. The contagious character of a disease, especially when the disease is of slow development and of great lastingness, can be and must be proved, according to my ideas, by the study of the intimate nature of the ailment, of its appearance, spread and disappearance, within certain areas and in relation to groups of population. It is the principle of circumstantial evidence applied to etiology, a kind of evidence which, in such matters, I, for one, consider much surer than the testimony of few or several witnesses, who possibly may delude themselves or be deluded. The negative proofs are of some value only when general in character, and, at the same time, not

contradicted by positive facts. This negative evidence has been invoked in the case of the most evidently contagious diseases.

The way in which leprosy disappeared from countries where it formerly prevailed, the common consensus of nations, as proved by their legislation and the means taken by Church and State to eradicate the disease, are witnesses to the contagiousness of leprosy; what I have ascertained and observed myself, in New Brunswick, is in full confirmation of the truth of that belief. It cannot be expected to have such a subject treated in the short answers to an interrogatory. I intend to do so in a work, the materials of which I have been collecting for many years, if I am spared to complete my investigations and to finish the labour now far advanced.

c. One husband of a leprous woman and one wife of a leprous husband have, so far, had the disease in New Brunswick. The sexual organs, in both sexes, are apt to show several of the manifestations of leprosy; the logical inference is, that if the malady can be communicated by contact or inoculation, such a contact as is produced in sexual intercourse, may give effect to the transmissibility of the affection; provided the local lesions of the diseased are such as to produce the transmission, and the healthy subject is susceptible of acquiring the malady.

It is proper to remark here that there never was, in New Brunswick, a marriage contracted by a leper, man or woman; but married people have continued to cohabit after the appearance of the disease in one of the conjoints. The details which would be necessary to judge of the extent of the exposure have not been, and could hardly be investigated, except in two cases in which, I believe myself sufficiently informed of the fact, there were no apparent local lesions. In these two cases the same conjoints did not get leprosy, and the children born from that cohabitation are not lepers.

A. 11.—Persons affected with leprosy are segregated, in New Brunswick, and do not communicate freely with the rest of the community when the existence of the disease is fully ascertained, and their entry in the Lazaretto has been secured; there has been, however, a few accidental exceptions to this rule; I do not speak here of the occasional visits of relatives and friends, which are allowed under certain restrictions.

For years past the segregation has not been enforced by violent measures, but the exertions, particularly on the part of the clergy, to induce the sick to enter the Lazaretto have been unceasing, and

the result has been that for many years all lepers, with only two exceptions that I know for certain, have resorted to the Lazaretto and have remained there till death, or are there yet. The two exceptions are of one girl, who, a few years ago, went abroad, and of one married woman, who, after a very short sojourn in the Lazaretto, was taken out by her husband and died at home. It was only in 1844 that a Lazaretto was established, there were no means before to isolate the lepers; for some years after several lepers died out of the Lazaretto.

The difficulties of early removals, apart from the painful severance of family ties, apply to cases in which the labour or services rendered by the lepers are still of great importance to their families. It would be almost a necessary complement to the establishment of Lazarettoes to provide some little means to lessen such difficulties when they do occur.

A. 12.—An institution, supported at the public expense, is provided for the lepers, where these unfortunates are under the care of Sisters of Charity, ministered by a chaplain and visited by a physician. The leprous sick are not sent to general hospitals.

The building devoted to lepers, located in the parish of Tracadie, officially called Saumarez, in the county of Gloucester, occupies a pretty situation; it is a wooden structure, comprising three divisions, one for the sisters, one for the male and another for the female patients; each division is again sub-divided in wards and rooms. There is a small inside chapel.

The sanitary conditions are, we may say, good. There have been very few cases of complication of the disease with other serious ailments; of course, I do not take symptomatic diarrhœa and other symptomatic catarrhal affections as distinct intercurrent diseases. The establishment is provided with a pharmacy, baths and other minor contrivances. The whole is on a very modest scale indeed, but has answered the purpose. It is much better now than it formerly was.

The attendance and nursing are all that could be desired, such as religious motives can inspire and charitable commiseration can bestow. Notwithstanding the economy of the annual grant, the inmates of the Lazaretto are made as happy as they can be under the direful visitation to which they are submitted, and to which they do submit with admirable resignation: truly, they obey the precept given by the church, to their brethren of the middle-age—*Sis mortuus mundo iterum Deo vivens*.

A. 13.—The number of inmates in the Lazaretto on the 15th May, 1885, was twenty-two, of whom one, a girl, is not a leper; she is affected with lupus. Of the twenty-one lepers eleven were men and ten women. The annual grant is \$3,200, and includes the small remuneration of the chaplain, the indemnity of the visiting physician, the allowance to the sisters and the wages and board of two servants.

A. 14.—Since the establishment of a Lazaretto, in 1844, leprosy has been, more or less, kept in check, in New Brunswick, and for several years past, especially during the last few years, it has undergone a notable diminution. The check and the decrease are in ratio of the more or less prompt resort to the Lazaretto; segregation is, in my opinion, the cause of the diminution of the disease.

The population of the Lazaretto has undergone oscillations of numbers from a larger to a smaller figure and *vice versa*, on account of the variations in the annual number of deaths and on account of the success of the exertions to bring in all known cases of the disease: therefore it would not do to rely on the number of inmates of the Lazaretto, at a given moment, to judge of the comparative prevalence of the malady, from year to year; the outdoor lepers must be counted as well as the indoor patients.

The diminution in the number of persons affected by the disease, in New Brunswick, has been slow but steady for a good many years. I repeat, this is entirely due to stricter outer precautionary measures and to effective insulation. The absolute number of lepers is reduced, and the diminution in ratio of the population is still greater. I give here two tables, showing the absolute numbers and the entire movement of the leper population, in New Brunswick, for the last decenniad.

TABLE I.—STATEMENT OF THE NUMBER OF PATIENTS IN THE LAZARETTO, LEPEERS AND NOT LEPEERS, THE NUMBER OF LEPEERS OUTSIDE OF THE LAZARETTO, AND THE TOTAL NUMBER OF LEPEERS IN THE PROVINCE OF NEW BRUNSWICK ON THE 1ST JANUARY OF EACH YEAR MENTIONED.

1875—1885.

Years.	Patients in the Lazaret.		Total Patients in the Lazaret.	Not Leprous in the Lazaret		Total not Leprous in the Lazaret.	Lepeers in the Lazaret.		Total in the Lazaret.	Lepeers Outside.		Total Lepeers Outside.	Lepeers in New Brunswick.		Total Lepeers in New Brunswick.
	M.	W.		M.	W.		M.	W.		M.	W.		M.	W.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1875.....	15	6	21	1a	1b	2	14	5	19	6	11	17	20	16	36
1876.....	14	8	22	1a	1b	2	13	7	20	6	10	16	19	17	36
1877.....	10	6	16	1b	1b	1	10	5	15	7	12	19	17	17	34
1878.....	6	9	15	1b	1b	1	6	8	14	7	9	16	13	17	30
1879.....	9	9	18	1b	1b	1	9	8	17	5	7	12	14	15	29
1880.....	8	8	16	1b	1b	1	8	7	15	4	8	12	12	15	27
1881.....	6	10	16	1b	1b	1	6	9	15	5	8	13	11	17	28
1882.....	8	14	22	1b	1b	1	8	13	21	5	3	8	13	16	29
1883.....	11	15	26	1b	1b	1	11	14	25	4	1	5	15	15	30
1884.....	10	13	23	1b	1b	1	10	12	22	4	1	5	14	13	27
1885.....	10	12	22	1b	1b	1	10	11	21	3	1	4	13	12	25

REMARKS.—The figures marked *a*, in Table I., column 5, referred to a young boy sent to the Lazaretto on suspicion of leprosy. He was not a leper, and was, consequently, discharged in 1876. The figures marked *b*, in Table I., column 6, concern a young girl affected with lupus; she has been allowed to remain under the care of the sisters. The figure marked *c*, in Table II., column 9, relates to a married woman who died at her own house, and whose disappearance influences the result of the leper population at large, but not that of the Lazaretto.

TABLE II.—MOVEMENTS OF THE POPULATION OF THE LAZARETTO OF TRACADIE, AND OF THE WHOLE LEPROUS POPULATION OF NEW BRUNSWICK, DURING EACH YEAR OF THE LAST DECENNIAD, WITH NUMBER REMAINING ON THE 31ST DECEMBER OF EACH YEAR.

Years.	Entered in the Lazaret.		Total Entrd.		Deaths in the Lazaret.		Deaths Outside.		Grand Total of Death		New Cases		Total New Cases.		Lepers in the Lazaret.		Total Lepers in the Lazaret, Dec. 31.		Lepers Outside, Dec. 31.		Grand Total Lep'rs	
	M.	W.	M.	W.	M.	W.	M.	W.	M.	W.	M.	W.	M.	W.	M.	W.	M.	W.	M.	W.	M.	W.
1	2	3	4	5	6		7	8	9	10	11	12	13		14	15	16		17	18	19	
1875.....	1	2	3	2	2		2			2	1	1	2		13	7	20		6	10	36	
1876.....				3			5			5	1	2	3		10	5	15		7	12	34	
1877.....	2	4	6	6	1		7			7	2	1	3		6	8	14		7	9	30	
1878.....	4	3	7	1	3		4		1c	5	2	2	4		9	8	17		5	7	29	
1879.....	2	1	3	3	2		5			5	1	2	3		8	7	15		4	8	27	
1880.....		2	2	2			2			2	1		2		6	9	15		5	8	28	
1881.....	2	5	7				1			1	2		2		8	13	21		5	3	29	
1882.....	3	2	5				1			1	2		2		11	14	25		4	1	30	
1883.....				1	2		3			3					10	12	22		4	1	27	
1884.....	1		1	1	1		2			2					10	11	21		3	1	25	
	15	19	34	19	13		32		1c	33	12	10	22									

MOVEMENTS BETWEEN THE 1ST OF JANUARY AND THE 15TH OF MAY, 1885.

1885.....	1		1		1		1			1					11	10	21		2	1	24	
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It is not useless to repeat that the history of Lazarettoes alone is not a complete history of leprosy in the countries where these hospitals are established, and that the history of cases, as inmates of such hospitals, is not a full history of those cases, and it is for this reason that the preceding tables are made to take in the lepers at large as well as the lepers inhabiting the Lazaretto.

The figures of columns 11, 12 and 13, in Table II., may be somewhat defective, not in total numbers, but in the distribution of cases as appertaining to each particular year, on account of the extreme difficulty to ascertain with some precision the exact time of the beginning of the disease. They may also be deficient in so far as there might possibly exist one or two cases of leprosy not yet detected. But such little defects, if there are such defects, cannot materially influence the grand results, nor can they at all alter the significance of these tables: the broad facts would remain, with their distinctive features, in spite of the greatest possible deficiency of some details.

No leper, in New Brunswick, ever entered the Lazaretto on the first year of the outbreak of the disease; very few, if any, on the second year of the existence of the malady; several on the third year; many on the fourth, several on the fifth, and some at a still more advanced period. The patient hereinbefore mentioned, who has now been at least forty-six years a leper, expended only nine years of that time in that institution, on two distant occasions; she had been about six years sick when the Lazaretto was established.

The two tables concern altogether 58 patients, 32 men and 26 women; of these 58 cases, 36 are anterior to the first of January, 1875, and 22 are posterior to that date. The tables show that the disease has undergone, on the whole, a considerable diminution; notwithstanding the fact that the mortality has been, comparatively as well as absolutely, much less during the last five years of the decenniad. Another gratifying fact revealed by these tables, a fact which I consider connected with the decrease of the malady in the relation of cause and effect, is that a much greater proportion of the leper population existing at a given moment has been, for some years past, segregated in the Lazaretto than was formerly the case.

A. 15.—The results I have observed from good hygienic and dietetic treatment are that the influence of the disease is lessened and life is prolonged. This has been rendered very apparent at the Lazaretto, especially since the year 1880, when the buildings were

made more ample and comfortable, other improvements were provided for, and the entire management of the dietary was transferred to the care of the sisters, from the former direction of a functionary who was called keeper-cook. These beneficial results of good sanitary measures are, nevertheless, only a respite of a few years at best.

The various and multiplied attempts made at different times, in New Brunswick, by medical men, or under medical guidance, to cure the disease, have all failed, as have also failed several empiric methods and vaunted medicines.

Remedial attendance to common functional disorders, palliative treatment of the painful manifestations of leprosy, and attentive nursing of the patients, although no cure, are, nevertheless, highly beneficial, and are constantly resorted to at the New Brunswick Lazaretto.

I have never seen a spontaneous cure of leprosy; nor has there been any, so far, in New Brunswick, where all lepers have died of the disease who are not still alive, with the exception of one death from intercurrent phthisis and one from intercurrent pleurisy. There have been discharges, especially of children, from the Lazaretto, of several who had been received on mere suspicion or unconfirmed diagnosis, and many years ago of a few lepers who were reported cured, but who have all come back with the disease. One of these, now in the Lazaretto, is the woman I have before mentioned as having had the disease for at least forty-six years. This case is so very remarkable in many respects that I think it well to recite it. This woman was born in 1813, and was married in 1832. She was strong and healthy, and the mother of two children, when the disease made its first appearance in her system—about 1838. She nevertheless continued to cohabit with her husband, to attend to her household, to enjoy fair health, and had three children after the outbreak of the disease; the last of these, the fifth, so far, was at the breast, nursed by the mother, when both were forced to enter the Lazaretto, on its opening in 1844. During her sojourn in this institution her general health was good, but the malady made local progress, at first fearfully mutilating her hands and feet. Then she entered a period of quasi suspense, during which, after having been submitted to a medical treatment, she was declared cured, and discharged in 1849. Being returned to her husband she got a child in 1850, and another, the seventh, in 1854. She lived at home with

her husband, who died in 1874, and then with her son till 1880. Then she entered the Lazaretto for the second time. During the thirty-one years that elapsed between her exit from and her return to the Lazaretto, she was an enigma for all her relations and neighbours; some said she was cured, some said she was not; at times she appeared well, at other times she did not look so well. I visited her at home on several distant occasions, and this is what I have been able to observe and gather:—A very slow, but still apparent, progress of the morbid process in the appendages of her eyes; pains in the bones, which she attributed to rheumatism. I succeeded in getting, in spite of her unwillingness to account for herself, some information of the presence of anæsthesia fixed in her mutilated hands and feet, and undergoing changes of localisation in other parts of her body; these must have been followed by other occasional outward manifestations; she would not, however, admit any such thing. I felt sure that the malady was still in her, and told the Sisters that, if she did not die from some other cause before, she was sure to come again in the Lazaretto, where she is now, yet strong enough for her seventy-two years of age, but with characteristic anæsthesia, bone-aching and the occasional development of small leprous ulcers.

The husband was, to his last days, perfectly free from any sign of leprosy. Of her children, grandchildren and great grandchildren, only one has been the victim of the malady—her last child, a girl, who died a few days ago at the Lazaretto. That girl was attacked by the disease in 1863, in her ninth year of age, and is the patient I have mentioned in whom the ailment has lasted twenty-two years. The father and mother of the old woman, as well as her ancestors, were all free from the disease to their deaths; but a sister-in-law, with whom she was in intimate relation, died of leprosy; and two of her younger brothers, also, fell victims of the malady.

The case of that woman proves that leprosy may attack a person free from any hereditary taint; it proves that fecundity of women can be preserved even when the malady had lasted for a long time, although it is not so in every case; it proves that cohabitation may not communicate the disease, although it may in certain cases; it proves that children are born healthy, notwithstanding the existence of leprosy in parents, although they may acquire it. As regards the question of hereditary and contagious transmission, this remarkable case offers an interesting subject of study, which I intend to take up, with several other cases, in my projected work on leprosy.

A. 16.—The population of the whole Province of New Brunswick, according to the last census, was, on the 4th of April, 1881, 321,233 souls. The population of the county of Gloucester was 21,614 and the population of the county of Northumberland 25,109.

The total area of New Brunswick covers 17,393,410 acres of land. The superficies of the county of Gloucester amount to 1,077,960 acres, and the area of the county of Northumberland is 3,046,640 acres, as approximately ascertained by geographical measurements made in connection with the census.

The superficies occupied, that is comprised in the inhabitants' holdings, amounted to 189,346 acres in the county of Gloucester and to 265,148 acres in the county of Northumberland.

The extent of cleared land in the county of Gloucester was 48,639 acres, and in the county of Northumberland 53,416 acres; the rest of the superficies of the holdings was in its primitive forest state.

I annex to these answers a small map representing a portion of the two counties of Gloucester and Northumberland, and especially the section where leprosy did occur or is still in existence: the red colouring indicates the particular localities visited by the scourge. All these localities are along the littoral of the Gulf of St. Lawrence and of the lower part of the River Miramichi; but no deduction can be drawn from this fact, as regards the alleged influence of the vicinity of masses of water on the spread and prevalence of leprosy, for the simple reason that the interior of the two counties is not settled.

There is a uniform registration of births and deaths, but it is not general, being only carried on among the Catholic population; it does not, however, include the causes of death. The registration has existed since the earliest settlement of the country by the French. Although many of the registers are not complete records, owing to the circumstance that, for certain periods of time, these populations were ministered by missionaries or priests having several localities to attend, yet they are such that the ancestry of the French-Acadian families can, as a rule, be traced back to their first appearance on this continent, by having recourse to the series of Acadian registers of various times and places.

In the absence of registration among the Protestant population, I have had to carry on enquiry with the relatives, friends and old acquaintances of the Protestants who have fallen victims of leprosy, being nine in number. The information thus gathered by me, in

addition to written accounts of the commencement of the disease, is sufficient, in every respect, to elucidate the essential facts relating to the history of each case, although it is impossible to trace the ancestry very far back, and although dates cannot be given with the same precision as such as concern the cases which have appeared among the Catholic population.

A. 17.—Leprosy has made its appearance in the town of Chatham, in the parishes of Nelson, of Northesk and Alnwick, in the county of Northumberland, and in the parishes of Saumarez, of Inkerman, of Chipagan and of Caraquette, in the county of Gloucester.

The names of Saumarez and of Inkerman are the political official names, but the popular, historical and ecclesiastical names are respectively Tracadie and Pokmouche. Again, within the limits of the official parish of Alnwick there are several localities bearing particular designations. Two of these localities are connected with the history of leprosy, namely, Nigaouek and Tabouchemtek, in the north-eastern extremity of the county of Northumberland. There is to be remarked, also, that a portion of Tabouchemtek forms part of the ecclesiastical parish of Nigaouek, and that the rest is annexed to the parish of Tracadie.

I have given the names of all the places where the disease has made its appearance; but it has not become endemic in all these localities. The malady has fixed itself in Nigaouek, Tracadie, Pokmouche, Chipagan and Caraquette. Caraquette has furnished only few occasional cases, Nigaouek, Pokmouche and Chipagan a good many, and Tracadie the great bulk of them. In fact, this latter place has been, and remains, the focus of the malady, the centre from which it has radiated; several cases which have occurred in the other localities just now mentioned have originated in Tracadie. The two first cases of leprosy in New Brunswick do not, however, as well as several others, come within that category of Tracadian origin.

In the following small table are given the names of the localities to which all the lepers existing in New Brunswick on the 15th of May, 1885 belong, with the population of each place, as ascertained by the census on the 4th of April, 1881:—

NAMES OF LOCALITIES.	Population, 1881....	Lepers in Lazaretto, 1885.....	Lepers Outside, 1885	Total Lepers, 1885..
Tracadie	2,819	13	2	15
Pokmouche.....	1,804	4	..	4
Chipagan	2,322	3	..	3
Caraquette	3,837	..	1	1
Nigaoek	* 2,646	1	..	1

* This is the total population of Alnwick, of which about 200 are to be added to Tracadie, about 500 to other circumscriptions, leaving the balance to the ecclesiastical parish of Nigaoek.

Before closing this brief memorandum, in answer to the interrogatories put to me, I think it necessary to mention that numerous mistakes, of various kinds, and very serious errors of facts, have found their way in papers, reports and books on leprosy, as regards the history and features of the disease in New Brunswick. I say so, simply to warn against such mistakes and errors and to show that the statements made here, contradictory to such, are not made in ignorance of what has been enunciated before.

FROM DR. A. C. SMITH.

A. 1.—Leprosy has existed in the Province of New Brunswick, Canada, for many years. It is a specific disease, characterized by the slow development of nodular growths in connection with the skin, mucous membranes and nerves, in the latter case, by the supervention of anæsthesia, and a tendency to ulcerative destruction.

a. The tubercular and anæsthetic.

b. I agree with Dr. Taché, who has kindly allowed me the privilege of reading his replies to these questions, in his statement that these are varieties of one morbid state.

c. The specific phenomena develop themselves according as the skin and mucous membrane on the one hand, or the nerves on the other, are principally affected; although in some cases all these tissues are implicated simultaneously or in succession.

A. 2.—When resident physician I admitted boys of eight years of age, and one woman who was a septuagenarian. The disease, however, is chiefly confined to young adults.

The premonitory symptoms often continue for a long period, and may include lassitude and depression, accompanied by a constant inclination to sleep, even when at work; then follow pains in different parts of the body simulating rheumatism, and in turn followed by a train of symptoms described by Dr. Taché in his reply to this question.

A. 3.—This depends on the age and constitutional vigour of the individual. The duration of the anæsthetic variety seems to be much longer than that of the tubercular. In New Brunswick as elsewhere, an essential feature in its life history is its extreme chronicity.

A. 4.—It is much more frequent in the male.

A. 5.—The disease is at present confined to persons of French descent. In former years several persons of other nationalities have been affected, doubtless through contagion.

A. 6.—During my residence in Tracadie I observed that the disease appeared only among the poorer class. In one of my reports I stated that “as the condition of the people improved, bringing with it a more nourishing diet, the disease would eventually disappear.” Poverty, *per se*, cannot cause the disease, but, because of the depressing influence, it seems to favour its development in persons who are *predisposed to it by hereditary taint*.

I fully agree with Dr. Taché in his statement that “the circumstances which favor the development of leprosy are the close intimacy of family life and the great sociability of the people.”

a. Tracadie is on the sea-coast.

b. The people are settled on farms; consequently, the dwellings are isolated and healthy.

c. The habits of life are good. The people are religious and marry young.

d. There is now abundance of healthy food to be obtained. The indolent ones are, of course, the poorer ones, and *their* diet is seldom wholesome. I have frequently noticed that when such persons are ill from serious disease they readily succumb.

e. Fishing and farming.

A. 7.—I beg to refer to Dr. Taché's reply to this question, inasmuch as mine would necessarily be similar to it.

A. 8.—I am unable to adduce *proofs* of the hereditary nature of the disease, but hold that the theories of *hereditary transmission* and *contagion* are not incompatible. The disease frequently skips over a generation.

I have known many instances where one member only of a family was affected.

A. 9.—I have no reason to suspect that leprosy in any way depends on, or is connected with any other disease—it is a disease *sui generis*.

A. 10.—I have not met with instances of the disease of which I could affirm that they had been communicated by diseased persons; but I am convinced that leprosy is contagious, although not to the extent of other contagious diseases. The people of the leprous district intermarry very freely, and it is difficult to exclude hereditary taint. But I am confident that in former years persons free from hereditary taint contracted the disease, while living in Tracadie.

A. 11.—It is not at all times easy to secure prompt removal of affected persons to the Lazaretto, but once admitted, segregation is complete and permanent.

A. 12.—To Dr. Taché's reply to this question I would refer for full particulars, which it is unnecessary to repeat.

A. 13.—The number at the close of 1884 was twenty-two.

A. 14.—It is on the decrease. At one time there were nearly forty inmates of the Lazaretto. To the improving condition of the people, and the *segregation of those affected*, I attribute the diminution.

A. 15.—As the result of long observation, I am convinced that good hygienic measures, including a regular system of healthy diet, has great power in checking rapid progress in the disease—life is thereby prolonged.

I have never observed more than a temporary amelioration from any medicinal treatment, and only such as might be attributed to the influence of the mind over the body. My predecessor used coloured water, accompanied by strong assurances of benefit therefrom, and in every instance found a temporary improvement, equal in degree to any apparent benefit he found from the use of medicinal agents. I know of no spontaneous cure of the disease, although I know instances of temporary abeyance of the disease, lasting, in some cases, during a considerable period.

As. 16 and 17.—Answers to these questions being a simple matter

of ascertained statistical facts, my reply to each would be a repetition of Dr. Taché's reply. I therefore beg to refer to his statements.

FROM DR. J. E. GRAHAM, TORONTO.

1.—In New Brunswick; it occurs there in the three parishes, Tracadie, Caraque, and Pokmouche which are situated on a peninsula between the Bay of Chaleurs and the Miramichi River.

a. There are two forms. Tubercular and anæsthetic leprosy.

b. These two forms are but varieties of a common morbid state.

c. The tubercular form is distinguished by the presence of tubercles of various shape and size which appear on the surface of the skin; most frequently on the face; these tubercles enter atrophy or ulcerate.

2.—May appear at almost any age; in Tracadie as young as eight, and as old as eighty; the earliest symptoms are general debility, pain in the limbs and occasionally fever; general feeling of malaise. The appearance of maculæ is generally the earliest positive sign.

3.—The disease usually develops in three or four years. It usually proves fatal in seven or eight years.

4.—The disease is as frequent in the male as in the female sex.

5.—Not confined to any particular race.

6.—It is of most frequent occurrence among people whose dwellings are small and unhealthy and whose food is poor in character. In Tracadie stale fish is eaten freely.

a. It occurs frequently on the sea-coast and low damp countries.

b. In Tracadie sanitary condition bad; dwellings small and unhealthy.

c. Not cleanly. Lazy and slovenly.

d. Diet; potatoes, salt meat, and stale fish. Very little change of diet.

e. Farmers, fishermen.

7.—Previously mentioned condition.

8.—It is apparently hereditary; it is doubtful as to whether it is really hereditary.

9.—It is not connected with syphilis.

10.—Have known of cases, but have not seen any.

- e. It is communicable by sexual intercourse.
- 11.—In Tracadie they are kept in a Lazaretto, but they have liberty to see their friends.
- 12.—A separate infirmary is provided by the Government.
- 13.—About 24 or 25.
- 14.—Somewhat on the decrease.
- 15.—No good results from medical treatment. Much may be done by attending to the general health of patients.

CANARY ISLANDS.

DR. ANDRES NAVARRO TORRENS, DOCTOR IN CHARGE OF THE PROVINCIAL
HOSPITAL FOR ELEPHANTIASIS OF LAS PALMAS.

1.—Without being enabled to assure ourselves to-day of the date when leprosy first appeared in this Province there are reasons for believing that the disease dates back to the conquest of these islands only. The most ancient chroniclers make no mention of the fact of the natives suffering from such disease or indeed from any other one analogous to it.

a. At the present time there are, in this hospital only two kinds of leprosy; that is to say:—

1. a. *Lepra tuberculosa*, (Oliver) *Elephantiasis Græcorum-Leontiasis-Satyriasis-Lepra Tuberculosa Leontina*.

2. a. *Lepra Mutilans*. *Lepra ad manum pedumque articulos conversa* (Frank), St. Anthony's Evil, (so-called by the common people of these islands).

b. In my opinion, these are varieties of the same morbid condition; apart from the symptoms, which are common the one to the other, the two forms meet at times in one person and can be transmitted hereditarily indiscriminately.

c. 1st.—*Lepra Tuberculosa* presents maculæ somewhat reddish-violet, circular, raised above the skin, at first isolated and afterwards more or less confluent, to which frequently succeed rugosities and tubercles of the same color, tumefaction of the skin widely spread,

accompanied by squamous patches, general loss of hair, almost constant disappearance of that of beard as well as of the eyebrows and eyelids; notable deformity of the features occasioned by the coloration and swelling of all of the teguments of the face; anæsthesia which not only affects the tuberculous part of the skin but also all that which is hypertrophied and scaly.

2nd.—*Lepra Mutilans* presents the fingers and toes arched in permanent semiflexion, with atrophy of the extensor muscles of the same; sanious peri-articulated ulcers terminating with the falling off in turn of the phalanges, skin shiny and squamous in defined regions and almost constantly in the elbows and knees; anæsthesia which affects the squamous part of the skin.

2.—Between infancy and manhood and sometimes even in infancy.

Lepra Tuberculosa begins with papular eruptions (similar to the pustules raised by the bite of the mosquito) commencing very frequently in the cheeks, lobes of the ears, elbows and knees, thus giving, from its beginning a peculiar appearance to the patient on account of the almost universal accompaniment of the puffing up of the skin of the face.

Lepra Mutilans. In this the patient begins to feel at the commencement of the disease a sensation of titillation in the joints of the fingers; to this follows anæsthesia of the same and the beginning of contraction.

3.—It generally reaches its full development at adolescence.

It commonly terminates in death at the adult age or in incipient old age.

4.—I believe it is equally frequent in both sexes.

5.—I have only seen it in individuals of the white or Caucasian race.

6.—a. The dwellings of these unfortunates in this Province have been indiscriminately sea-coast, and city and country places having at times diverse conditions of soil.

This diversity in the dwellings of the lepers is in obedience, in my judgment, more to a conjunction of special circumstances than that the localities favor the development of the disease, owing to the fact that it is not common for them to leave the towns in which they originally established themselves on account of the horror their miserable appearance inspired strangers to them; thus perpetuating, in the places referred to, leprosy by hereditary. I do not desire to be understood by this observation that I do not believe it to be possi-

ble for leprosy to be spontaneous,—since several cases of it have been recorded—but the rather to accentuate the importance which in my opinion heredity holds.

b. As all the immense majority of the afflicted belong to the poor classes, it follows that generally their habitations are not healthy.

c. d. e.—Ordinarily they have little personal cleanliness so far as regards washing their bodies or clothing.

Some of the sufferers are fishermen but the greater part are occupied in field labor.

The food usually consists of fish salted, baked or roasted with a piquant sauce. The poor people also frequently use maize roasted and ground into flour (*gofio*) which they eat in great quantities dry or kneaded with water, milk or herb broth; also baked potatoes and several kinds of vegetables are eaten. With the exception of the salt fish the basis of the food is farinaceous.

As predisposing causes, besides those indicated and at times converting them into fixed facts, a prominent place must be occupied by the severe changes of temperature; and above all by the abrupt suppression of sweat by a sudden plunge of the body into water.

7.—I know of no others than the lack of hygiene.

8.—Hereditariness figures principally as the predisposing cause, from first to last.

I have seen issue by the same marriage, of which some have acquired the disease and others have not.

9.—I do not believe that leprosy has any relation with the other affections called syphilitic, scrofulous or eruptive.

10.—I do not know of any case of contagion of leprosy by means of contact more or less immediate, including sexual intercourse.

11.—The law places no obstacle to a union of such except, the repugnance inspired in the minds of the healthy by their appearance.

12.—In this hospital which has a provincial character there does not exist compulsory separation but a voluntary one since the former is at the present time forbidden by law. It is only when the lepers dedicate themselves to medical treatment that the authorities compel them to be secluded in this establishment.

Lepers are admitted exclusively to said hospital which in early times was created for them. It is divided into two large departments arranged for the separation of the two sexes. Viewed as a

building excellent conditions are united in it, but its internal arrangements forbid a convenient application of a good hygienic and medical treatment.

13.—At the present time there are the following inmates:—

Male.	{ Lepra Tuberculosa.....	20
	{ Lepra Mutilans.....	3
Female.	{ Lepra Tuberculosa.....	27
	{ Lepra Mutilans.....	3
	{ Lepra Tuberculosa-Mutilans.....	1
Total.....		54

14.—I believe to the contrary that far from the disease referred to showing any increase here it is diminishing in direct correspondence with improved condition of the poorer classes.

15.—I have not to this day seen any positive and evident cure of a radical cure by medicinal treatment. I believe that leprosy is incurable, (at least in the two forms which I have studied). But, it sometimes happens that the evolution of the disease is arrested, leaving the patient for a considerable time in a condition very compatible with health. Without denying that medical treatment can materially contribute to this condition I consider that dieting is of great efficacy.

In this hospital it has been observed that the disease has remained stationary in a few cases but it has never disappeared.

16 and 17.—It is not possible for me to reply to these two last questions the import of which I do not understand.

Las Palmas de Gran Canaria, June 1st, 1885.

CEYLON.

FROM DR. W. A. KYNSEY.

1.—True leprosy is known in Ceylon and has been recognized since the time of the Dutch occupation of the island, the earliest record of the disease being connected with the asylum founded and

transferred to the British Government by a Dutch lady who was herself a leper. It was known to the Sinhalese from a remote period as a skin disease under the name of "Gaja Charma" or Elephant-Skin, in association with other cutaneous disorders and has been more recently mixed up with "Parange" a prevalent local disease, having a close resemblance to the "yaws" of the West Indies. It exists in every form and phase, the anæsthetic being perhaps the most frequent, among the fish-eating population on the sea-board and in Colombo, the chief city of the island.

It is considered a constitutional disease "*sui generis*" and occurs in three principal forms, which in my opinion, are only varieties of one common morbid state.

The tubercular variety is recognized by the appearance of tubercles, erythematous raised patches and infiltrations of the skin involving the face, forehead and ears, lending the countenance its sinister aspect, and the trunk and extremities, with little or no diminution of sensibility, by the characteristic nasal voice, fissured and tuberculated condition of the tongue and palate: tumefaction of the fingers and toes, ulceration of the matrices and falling off of the nails;—swelling and hypertrophy of the feet and legs. With these are associated febrile reactions with eruptions of livid swellings (elephantoid fever) and frequent ulcerations and healing of tubercles.

The anæsthetic form is usually distinguished by maculæ or spots of a tawny color on a level with the skin which is usually scaly, dry and wrinkled in appearance, normally sensitive at first but gradually becoming benumbed in their centres, and inclined to spread and coalesce, forming extensive serpiginous patches generally following the course of nerves and often symmetrically arranged on the trunk and extremities. There is numbness commencing at the great toe or in the course or distribution of the ulnar and median nerves, involving subsequently the whole of both extremities up to the elbow and knees, flexion of the fingers on the palms, followed by the appearance of blebs or bullæ spontaneously or by proximity of the limb to a fire; and the supervention of unhealthy ulcerations resulting in necrosis and exfoliation of the bones and loss of fingers and toes, and ending in gangrene. Dry mummification of the extremities is frequently noticed with a shrivelled and fissured condition of the nails. A characteristic indolent ulcer is often found on the plantar surface of the great toe on the metatarsophalangeal joint, or at the

heel. The ulnar and median nerves are felt enlarged and thickened at the elbow and wrist. With loss of cutaneous sensibility there is also loss, sooner or later, of thermic and pain sensations; atrophy of the muscles of the arm and hand giving the latter its talon-like form, known as the bird-claw hand; and distortion of the feet with luxation at the ankle. The glands of the groin are invariably enlarged and prominent. In its permanent stage muscular paralysis and wasting supervene the orbicularis muscles, and muscles of the arms and legs become affected; extropion, eversion of the lips, wrist-drop, Keratitis with loss of vision and atrophy of the structures of the eye usually ensue. There are no febrile attacks with livid eruptions pathognomonic of tubercular leprosy in this form of the disease.

The mixed variety has, most if not all, the characteristic phenomena of the preceding forms, and is found more frequently associated, as the records of the Asylum show, in hereditary cases. Mutilations occur, but are not so extensive as in the anæsthetic variety, the loss of cutaneous sensibility is markedly evident in the extremities; the tubercles ulcerate and heal, but there is no super-vention of gangrene. Death usually occurs in leprosy from diarrhœa, dysentery, general dropsy, tuberculosis and from exhaustion from long continuance of the disease itself.

2.—At all ages from childhood to advanced life. I have not seen children born with the disease, but have observed anæsthetic leprosy in a child of three years, and well marked tubercular leprosy in children of nine and eleven years. There is at present a female inmate in the Asylum who has clearly manifested the disease in her fifty-seventh year, long after her two sons were affected with it.

The earliest symptoms in the anæsthetic form are usually indicative of some nerve lesion, as shooting or darting pains in the limbs, loss of morbidity of the fingers, burning sensations in the feet, formication all over the body, followed sometime after by loss of cutaneous sensibility, contraction of the little fingers, and the appearance of tawny-colored, benumbed spots on the face, trunk and limbs.

In the tubercular form the premonitory symptoms generally observed are a feeling of malaise, unusual drowsiness, vertigo, epistaxis, profuse sweating on the least exertion, the appearance of livid blotches with fever, attended with rigors, and tumefaction and thickening of the lobes of the ears.

In well-marked mixed leprosy, the fever and erythematous rash

are generally associated with commencing numbness of the fingers or a benumbed, discolored patch on the body and the occurrence of blebs on the extremities.

3.—The disease attains its full development, sooner or later, according to the circumstances and condition of the patient and the state of his general health. From ten to fifteen years is about the usual period; rarely the disease remains normally arrested for years. It usually proves fatal at middle age; the longest duration of the disease recorded in the Asylum for the tubercular form was sixteen years, anæsthetic twenty-eight, and mixed twenty-one years.

4.—The disease appears more often in men than in women in the proportion based on the figures in the records of the Asylum of eight to one.

5.—In this colony it is not exclusively confined to any community, but is more frequently observed among the Sinhalese and Tamils, seldom among the Eurasians, and more rarely among Europeans.

6.—Chiefly among the poorer classes such as cultivators or field-laborers, mechanics, cart-drivers, coolies or day-laborers, fishermen, and others whose occupation expose them to vicissitudes of weather and extremes of hot and cold.

It occurs more frequently on the western and southern sea-coast of the Island and in Colombo, the chief city, on the banks of rivers and littoral lakes, in low, more or less damp and malarial localities.

Sanitation is not much observed among the poorer natives, whose dwellings are usually small, thatched huts, ill-ventilated and crowded, with the immediate neighborhood filthy and strewn with mouldy and rotten vegetation and excremental deposits; their clothing deficient; their diet poor from insufficiency of nitrogenous elements, consisting chiefly of dry and salted or badly preserved fish, often in a rotten state, and inferior grain and vegetables; and their occupation, that of cultivators or coolies.

7.—All the above insanitary and unhygienic conditions associated with intemperance, sexual excesses, neglect and exposure; want of personal cleanliness; improper treatment by native practitioners and the abuse of mercury and opium. Most of the patients admitted into the hospital with the disease in its most aggravated form had been previously salivated or were habitual opium-eaters.

8.—A hereditary taint is frequently admitted by the patients in the Asylum, and several instances are on record of one or two members of a family being affected while others remain exempt from any trace of the disease.

9.—I have sometimes found it connected with Scrofula, Syphilis and Parangi; but have no reason to believe that it is any way dependent on these diseases. Leprosy also occurs associated with Scabies, Eczema, and Psoriasis, and other skin diseases among the fish-eating population of the island. I have seen it in connection with Elephantiasis Arabum.

10.—It is not considered contagious in Ceylon, and lepers are not generally shunned by their relatives or friends for fear of infection, but are often maintained by them in their own houses. It is in my opinion not contagious as Syphilis, Parangi, or the exanthematous diseases. There is no conclusive evidence in the Hospital records of communicability by direct contact with or close proximity to diseased persons. The attendants of the Hospital have for years been in close association with the lepers in all stages of the diseases, the head-servant for more than twenty years, and the washing of the establishment has been performed by a family in the neighborhood for four generations, but not a trace of the disease as I have reason to know has been observed among them.

It certainly does not appear to be transmissible by sexual intercourse, as there are numerous instances to my personal knowledge of leper wives and husbands who have not contracted the disease from each other.

11.—There is no restriction imposed or segregation enforced by legislative enactment or otherwise in respect of lepers in this Colony, who are allowed to mix freely with the people and are frequently met with in crowded localities in town as mendicants, and only brought into the Asylum when they become physically disabled and can no longer follow their lucrative calling in the streets. A partial restriction is perhaps observed among the home-dwellers in villages which are as a rule sparsely populated, a single family being afflicted and remaining voluntarily isolated from the rest of the community.

12.—An Asylum has been in existence prior to the commencement of the present century, probably from the time of the British occupation of the Colony, transferred to the Government, it is believed, by a Dutch lady as a home for lepers. It occupies a beautiful site in an isolated locality, four miles from the fort of Colombo, on the bank of the Kelani river in close proximity to the sea, and is well adapted, since the recent improvement it has undergone, for the seclusion and treatment of lepers. It consists of twelve wards having accommodation for 159 patients in separate blocks or

pavillions, well lighted and well ventilated, to which are attached latrines worked on the dry earth system and lavatories for hot and cold baths; the female wards being separated and isolated from the male by a partition wall. The Asylum is in charge of a resident medical officer under the supervision of the Principal Civil Medical Officer, and is wholly supported by Government at an annual cost to the Colony of Rs15,400. The dieting of the patients is according to the dietary scale for all the hospitals in the island, but more variety is observed in the distribution of the diet to suit the dyspeptic tendencies and voracious appetites of the patients, while extras are also liberally supplied when necessary, cleanliness is strictly enforced, river and sea-bathing are constantly practiced; the clothing changed twice a week, and the bedding aired as often as possible. The adult males are daily employed, excepting Sundays, in various occupations as ward attendants, etc., and in the gardens which they cultivate with vegetables for their own use; the females are occupied in sewing or in plaiting cadjans, and the children attend schools under leper teachers. A Roman Catholic chapel and Buddhist temple have also been provided them for religious purposes by the charitable contributions of their friends.

Lepers are not usually admitted into the general hospitals of the island, but are sometime, detained in them till they can be sent to the Asylum.

13.—The daily average of lepers in the Asylum maintained by the Government for the last five years was 125.

14.—The disease I have reason to believe, has decidedly increased since 1862, as the number of patients then in the Asylum was 63, but it has since increased to 151, being the maximum number treated since the beginning of the present year. Its increase among the general population cannot be established with precision owing to the absence of an exact registration enumerating lepers. Cases of strictly recent origin are relatively more frequent judging from the admissions into the Asylum, and the numerous instances that have come under my personal observation among the general community. I have no doubt that a certain reproduction of the disease is going on whatever the factors are at work, and that the proportionate growth of leprosy in the Colony, is by no means diminishing. Immigration from India of Malabar coolies infected with the disease has, in a great measure, contributed to the increase of pauper lepers in the island.

15.—No treatment as yet has been found of any permanent benefit, Chaulmoogra oil (*Oleum Gynocardiae Odorata*) has given beneficial results in the amelioration of some of the symptoms, such as the absorption of tubercles and healing of ulcers, Gurjun or wood oil, obtained from various species of *Dipterocarpi* used externally and internally, appears to retard the progress of the disease, but has never in any instance proved curative. Carbolic oil inunctions (1-40 Coconut oil) and vapor baths, Quinine and Iron, dilute Nitro; Hydrochloric acid in bitter infusions, Liq. Arsenicalis and Sulphur, where there are skin complications, and the Ferri. Iodid are the usual remedies employed in the Asylum, and have been found useful in improving the general health and amending the constitutional taint. As frequently the best results have been obtained from hygienic and dietetic treatment alone.

There is at present in the Asylum a Malabar patient in good general health admitted with anæsthetic leprosy, in whom the disease had been fully developed, whose case may be considered a spontaneous cure, no further symptoms having appeared during the last six years. The disease having apparently exhausted itself.

I cannot confidently assert that any patients have recovered under treatment, but a large proportion has been benefited and taken their discharge, and a great many more are now in the Asylum in ordinary good health without the appearance of fresh symptoms or any further progress of the disease for some years.

16.—By the last census on February 17th, 1881, the population was 2,759,738. There is a uniform registration of births and deaths, including the causes of deaths, existing since 1867, kept at the office of the Registrar General.

17.—In the Western Province including Colombo, the chief city of the Island, with a population of 897,329, and the Southern Province, including the township of Galle, with a population of 433,520. In the absence of statistical records on the subject, I am unable to give the number or proportion of lepers in these townships and districts. Leprosy is very unfrequent in the hilly districts of the Central and is but rarely observed in the other Provinces of the Island.

CHILI.

FROM D. THOMAS, ESQ., H. H. M'S., CHARGE D' AFFAIRES FOR CHILI.

SIR:—I have the honor to acknowledge receipt of Your Excellency's dispatch No. 1, under date of 25th March, the contents of which have had my attention.

Leprosy.—After making full enquiries from the principal medical gentlemen of this country, I have received the same answer from all, viz., that leprosy does not exist in Chili. It would be useless therefore to forward all the answers I have received, I therefore only enclose the one I received from Dr. J. J. Aguirre, Dean of the Faculty of Medicine of Santiago, Chili, with a translation.

“It would appear that leprosy does not exist in Chili. In none of the scientific publications do we find any case mentioned of this disease. In our own practice we have never observed any cases that could even vaguely appear as leprosy. We have consulted with sundry colleagues on the subject and from all we have received an answer in the negative. Consequently there does not exist in Chili laws or institutions relating to this subject.

(Signed.) “J. JOAQUIN AGUIRRE,
“Deacon of the Faculty of Medicine.”

FRANCE.

DISCUSSION BEFORE THE ACADEMY OF MEDICINE, PARIS, ON THE TRANSMISSIBILITY OF LEPROSY. (LE TEMPS, PARIS, OCTOBER, 1885).

Is Leprosy contagious? This is the question which M. Vidal, medical director of the St. Louis Hospital proposed to solve in a memoir which he has presented to the Academy.

M. Vidal believes in the contagious propagation of leprosy, and in this he only follows the general opinion. Both in Europe and in the East in the Middle Ages the leprosy were secluded in special establishments, with the object of isolating them and extinguishing the malady.

An European doctor, who was in the East, has proved that in fourteen cases of leprosy the malady had not been transmitted by heredity.

On the other side, it is alleged that lymphatic influence and scrofula have their weight in producing leprosy.

Practical experiments in the inoculation of animals with leprosy have given no result up to the present date. Nor is phthisis, in spite of its being contagious, inoculable.

Without doubt, the medical faculties assure us that in North America the propagation of leprosy is so constant and so regular that contagion alone can explain it.

In the Hawaiian Islands leprosy was unknown until the year 1848, when it was introduced by the Chinese; to-day it has attacked a twentieth part of the population.

Practical observations on the Island of Mauritius, analagous to those to which I have just referred, also prove its contagiousness. Leprosy was there also unknown until the year 1765; now it has attacked the inhabitants by the thousands.

In the Middle Ages, the isolation and the treatment employed in the hospitals victoriously combatted the disease, which had then become endemic. In the fifteenth century leprosy disappeared in the European countries, but even to-day persistently remains in Scandinavia. Without doubt, thanks to the improvement in hygiene, the malady is diminishing; in the space of twenty years, from 1860 to 1880, the number of lepers have decreased in Norway from 3,000 to 1,498, and nearly all of them have acquired the disease through heredity.

M. Vidal thinks that the prophylactic resources employed against leprosy should be in proportion to the grade of civilization of the people; they should be energetic if those for whom they are applied have not the knowledge of the efficacy of the necessity for hygienic rules, and always having for an aim the convincing of the public mind of the importance of hygiene.

M. Hardey puts a side question in regard to the etiology and the propagation of leprosy.—He wished, he said, to abide by clinical

facts; leprosy, according to him, is not contagious in those countries in which it habitually reigns. He had observed in Paris numerous cases of leprosy which in the absolute had been contagious. In order that the contagion of the disease should establish itself, special local conditions were required which were wanting in our boundaries.

"Be it so," replied M. Vidal, "in France the climatic conditions and the regular habits and cleanliness, constitute, it may be, insuperable obstacles to the propagation of leprosy."

"In my recent visit to Constantinople," said M. Dujardin-Beaumetz, "I had an opportunity to observe some 3,000 lepers, of which number a part were in the hospitals and the rest wandered free about the streets. One could visit, without great difficulty, the hospitals, although they are not often visited by the superstitious people who believe that visiting the lepers attracts to their hearths all manner of diseases. It is not a rare thing to see lepers marry with healthy women, without contagion resulting to the women or children.

"The lepers who wander around the streets, roughly calculated at 200, more or less, are many with healthy women, or with lepers like themselves. There are authors who vacillate by saying that leprosy may be hereditary; and without any doubt, I have seen lepers, the children of lepers.

"The experimental physiologists say that since there exists a microbe of leprosy there must of necessity exist contagion. I am not of this opinion; there may very well exist the microbe, without there necessarily being contagion. Thus, for example, intermittent fever, which has its microbe, is not contagious; but above all, we must not forget that even now the existence of a leprosy microbe must be proved."

M. Paul Constantine said, that the problem of contagion swayed between two contrary opinions. Medical authorities worthy of respect, denied the contagiousness; European doctors all followed this theory, and what is certain is, that inoculations have given no results; it is left therefore for us yet to judge from testimony from farther abroad, and this is not very well proved.

M. Leroy de Méricourt testified that M. Brassac, Naval Surgeon, who had carefully studied leprosy, would not admit its contagion but believed in its hereditary transmission.

M. Lagneau observed that in early times there existed in Western Europe a firm opinion that leprosy was peculiar to the people of the North.

Baron Larrey said that his father, who had the opportunity of studying the disease in Egypt, did not believe in its contagiousness.

M. Vidal in replying to his opponents, said, that in the Hawaiian Islands leprosy generally is not hereditary; that the malady could not be attributed to misery nor to the use of decomposed fish; that in India there were 102,000 lepers who absolutely did not consume fish; that leprosy could not be attributable to the climate since it existed in every country; that it is not inoculable; that it could be contagious in a lingering manner, and even latent, as has been proved in many cases; and finally, that the opinion in regard to contagion stood, as they say, in *secular* possession of the scientific domain, and that it behooved its adversaries to refute it.

THE NEXT SESSION.

M. Leroy de Méricourt continued the discussion on the question whether leprosy was contagious or not, the discussion commencing at the previous session. M. Vidal, to prove propagation by contagion of this malady in the Sandwich Islands, produced a memoir by Mr. Woods, an American doctor. M. Leroy de Méricourt analyzed and criticized the most notable passages in the memoir, and his criticisms resulted that the opinion of Mr. Woods lost much of its weight by a considerable conjunction of facts. In the year 1555 the Portuguese had visited those distant shores, and there is no doubt that later on the expedition of Captain Cook carried there syphilis, it being a well known thing to many doctors, that leprosy is but a transformation from "syphilitic cachexia." The Hawaiian Islands are under the tropic of Cancer; its climatic condition, the licentious customs of the inhabitants, favored there the development of all infectious diseases; and, in a word, if leprosy had been imported into those Islands, it must have been at a very remote epoch, and that the case to which they referred of a Chinaman who was the first to be attacked by this disease in 1848, must be regarded as a tale. Syphilitic cachexia and scrofula have existed in Hawaii and the other Islands of the Pacific for a much longer time.

M. Leroy de Méricourt was not altogether assured of the recent importation of leprosy in the Island of Mauritius; from very remote times there had existed very frequent commercial relations with the Indies and all the western coast of Africa.

Leprosy is a bacilarial malady, whose propagation remains buried in obscurity; its hereditariness, certainly cannot be denied as being

one of the forms of its propagation; these may also be the introduction into the blood of morbid materials, proceeding from the leprous ulcers; but leprosy is not contagious in the sense we give to that expression, in the same way as small-pox, typhoid fever and cholera.

The microbial doctrines have caused the evil of propagating through all parts the idea of contagion, producing among the public a true and very serious pre-occupation. For their part, these doctors have seen on every side whole armies of morbid germs, and this illusion has made them carry out the isolation of the diseased even to the very limits of ferocity. If this movement is not restrained, we shall arrive at seeing as many wards of isolation as there are different diseases in existence. It is about time that we cast away from ourselves all these notions, and moulded ourselves to new ideas more in harmony with truth and reflection.

M. Vidal replied to all this: Leprosy and syphilis should not be confounded in their manifestation; that both could be presented at the same time and in the same subject and mutually develop; and that the word syphilis could not be translated into that of leprosy, according to the authors whose testimony he had invoked. M. Vidal insisted on believing in the cases pointed out by Mr. Woods, as having occurred in Hawaii, and that they could not be explained either by spontaneous generation, resulting from alimentation, misery, etc., nor by heredity; they had their origin without doubt, in the importation of the plague in the year 1848. The rapid development of leprosy from this date, necessarily implies the existence or the possibility of contagion. In the opinion of M. Dujardin-Beaumetz a bacillarial malady, the marsh fever, for example, may be bacillarial but not contagious, not even by inoculation. Might I not record, said M. Vidal, recent experiments which appear to indicate the possibility of inoculating the marsh fever.

M. Leroy de Méricourt supported the opinion of all the Naval Surgeons, who had observed the malady in every latitude and did not consider it contagious.

M. Jules Rochard observed that, in his opinion, it was not certain that leprosy had been imported into the Sandwich Islands in 1848, since M. Quoy had seen it there since 1819, when he made his voyage of circumnavigation.

M. Vidal replied that the terms of M. Quoy's statement apparently referred to syphilis and elephantiasis more than to leprosy.

GUATEMALA.

FROM DR. MIGUEL VALLADARES, PHYSICIAN OF THE LAZARETTO, AND
DOCTOR JOAQUIN YELA, DIRECTOR OF THE PUBLIC
HOSPITAL AND ASYLUM, GUATEMALA.

1.—Yes.

a.—Three; tuberculous, anæsthetic, and one which is a combination of both of these.

b.—It is one and the same disease, with different symptoms.

c.—In the tuberculous form, enlargement of the ears (which is the place where the disease generally first begins to show itself,) the complexion of the face is changed to a copper hue, eyelashes and eyelids and brows fall off. In the anæsthetic form the patient has no sense of touch or temperature; pricking him with a needle, he does not feel it; eyelashes and brows fall off, also lower eyelid; he suffers from muscular atrophy.

2.—The disease is most frequently met with between the age of twenty and forty. I have met with only two patients of tender age, one of six and one of seven years of age, but I have heard of two or three cases, where the afflicted were twelve to fifteen years of age.*

The first symptoms are: rose-colored spots on the face and other parts of the body; these spots grow darker and gradually change to a purple color; when these spots disappear, the skin thickens where these spots have been. In the anæsthetic form these spots do not appear; this form immediately commences with insensibility with the lower or upper parts of the body.

The development of the disease has no fixed time; the younger the patient the more rapid the progress of the disease. I know of cases where the patients have neither improved nor become worse for several years, but as a rule, the disease terminates fatally in from four to eight years.

*The doctor speaks of the patients he has treated in the Leper Hospital; well-to-do families contrive to secrete an afflicted member of the family in some remote place; this to my personal knowledge. —H. H. M's, Consul.

4.—Amongst men; nine men to six women.

5.—In Guatemala it is an almost unheard of thing for an Indian to be afflicted with leprosy; my patients have all been "Ladinos," (descendants of Spaniards and Indians†).

6.—*a.* On the sea coast which is low; and in the Department (or province) of Quezaltenango, which is 6,000 feet above the level of the sea, and the coldest region of this republic, leprosy is but little seen.

Near the †Capital, where the climate is very variable, is the spot where leprosy most exists.

b.—The dwellings are generally a house of two or three rooms; houses built of "adobe" and covered with brick tiles, slanting roof.

c.—People of the lower class, who live on the cheapest kind of food and give no attention to cleanliness.

d.—Plantains, bananas, beans, (fried in lard); work only when absolute necessity compels them.

e.—Farm-hands.

7.—Want of fresh air; the custom (amongst the poor class) of whole families sleeping in one room; want of cleanliness, and use of alcoholic liquors.

8.—Yes; I think it is often hereditary; but I know of three instances, two of which, in which the father, and one, in which the mother, were afflicted with leprosy, and although the parties were well aware of their disease, they cohabited, and the children bear no trace of the disease; but in one of these cases, (where the father was a leper) the daughter married, and her child had the disease.

I am convinced that the disease will re-appear in the second generation. I know of several instances, where a member of a family had this disease, and the other members of the family were exempt from it.

9.—I know of only one leper who was syphilitic before being attacked with leprosy; my other patients have had no syphilis, moreover, I have observed that a mercurial treatment aggravates the disease of leprosy in a patient.

†By H. H. M's. Consul. This statement, although verified by other doctors, must be taken "cum grano salis," as there are plenty of Indian villages and settlements, which are rarely, if ever, seen by a doctor.

‡5,000 feet above the level of the sea, and where there are scarcely any pure Indians.—H. H. M's. Consul.

10.—I have not.

10.—c. I think it is; refer to question 8.

11.—No; they are strictly segregated.§

13.—Nine men and six women.

14.—The disease has increased in Central America, because the lepers were not until lately segregated, and members of families known to have leprosy were allowed to marry; while it is a known fact, that although the son or daughter of a leper may bear no visible traces of this disease, the grand-children are sure to be leprous.

15.—Lepers should have plenty of fresh air, wear flannel clothing, bathe every day in tepid water, eat roast meat, thick soups and milk.

I use in the treatment, astringents both internally and externally. Two grammes tanuid, and one of extract of ratania, make twenty pills, to take four per day. Exterior treatment: one gramme acido fenico, with thirty of glycerine, and fifty centi-grammes borato de soda; to be well rubbed in twice a day for about half an hour each time; for ulcers, two grammes iodoformio and thirty of vasaline. This is my treatment of the tuberculous form. In the anæsthetic form, I have noticed that internal astringents are of great benefit, also electric currents ascending the back-bone.

I have never seen or heard of leprosy undergoing a spontaneous cure; of my patients in the Hospital, two were partly cured in the third stage, and one radically in the second stage, the two former anæsthetic, and the latter one tuberculous.

16.—Republic, 1,400,000 (of which two-thirds are full blood Indians).

Capital 60,000 last year.

Yes; since eleven years ago.

§See question No. 2. -H. H. M's. Consul.

The Consul asks whether the government enforces separation? A

long time ago, driven through unsufficiently grounded fear, some lepers were transported from Brombeck to Veenhuisen and there forcibly segregated.

I do not know whether this still happens. Other lepers, dwelling at Brombeck, who did not go to Veenhuisen, have rejoined common society without any harm resulting therefrom.

In the fourth place it is asked, do any hospitals or asylums for lepers exist in the Netherlands or its colonies? This question must be answered negatively unless the Veenhuisen incident is considered.

Fifthly and finally the Consul asks, "What is the prevalent popular opinion as to contagiousness of leprosy, and do healthy persons carefully avoid those who have the disease?"

The conviction, it can easily be seen, of all whose opinion has any value (for in such a case the popular idea of the ignorant is certainly quite unreliable) is that leprosy in the only forms in which we see it in the Netherlands, is not transmitted from one person to another, (except as hereditary disease).

And since the disease so seldom occurs, there is little need for avoiding those who are afflicted with it. It proves nothing that some people are afraid of a leprous patient.

The Inspector for the State Medical Bureau, for the Province of Ynid, Holland.

(Signed.)

EGELING.

HONGKONG,

FROM HON. WM. KESWICK, HIS MAJESTY'S CONSUL GENERAL AT
HONGKONG.

To His Excellency WALTER MURRAY GIBSON,

Minister of Foreign Affairs, Honolulu.

SIR:—Referring to my letter of the 12th of March, I have now the honor of laying before you the result of my enquiries as to Leprosy.

It does not prevail to any extent in this Colony.

The only legislation with regard to it is in the following section of an Ordinance:

“Every master of a junk, vessel, or boat, bringing into the Colony or from one part of the Colony to another, any person who shall in the opinion of the Court before which the offence shall be tried have come to the Colony for the purpose of mendicancy, or any person suffering from leprosy or any contagious disease, shall incur a penalty not exceeding ten dollars for every such person so brought by him as aforesaid.”

There are cases amongst the lowest class of Chinese which however have not been treated by European practitioners. I am therefore unable to return the printed form filled up as you desired.

I have the honor to be sir, your most obedient servant,

WM. KESWICK.

MEXICO.

DR. JUAN M. GOMEZ, DIRECTOR OF THE LAZAR DEPARTMENT, JUAREZ HOSPITAL.

There is in Mexico a malady known as “Mal de S. Lázaro,” (St. Lazarus’ evil) the symptoms of which correspond with the disease commonly known under the name of *Elephantiasis Græcorum*, and which some European doctors have also called leprosy.

The following replies refer to the “Mal de S. Lázaro:”

1.—The “Mal de S. Lázaro” exists in Mexico, and principally in its western regions.

a.—This disease shows itself under the following forms; tuberculosa, anæsthetica, and Maculosa:

The tubercular form; characterized by the dropping of the external part of the eyelids, and by the existence of tubercles which appear on the forehead, the face, the supraciliary region, the ears and on the outward face of the arm, and the back of the forearm.

The anæsthetic form has as its characteristics the reabsorption of

the tarsal cartilages; of the muscular masses of the thenar and hip-thenar regions; and the retraction of the muscles and tendons of the flexors of the fingers.

And last, the macular form: this is characterized by the appearance of irregular maculæ which generally appear on the limbs, and by falling out of the hair; much more notable in these diseases since the complete falling off of the eyebrows and the hair of the breast has been observed.

b.—It is believed they are varieties of the same disease; they combine one with the other; for instance, two in one and the same individual.

c.—There is anæsthesia in the three forms; in the macular, gangrenous, even-speckled maculæ; in the tuberculous, hard tubercles similar to syphilitic tubercles; and in that called anæsthetic there is a reabsorption of the osseous texture, and of certain cartilages (the tarsal) and the anæsthesia is more extended and profound.

2.—It generally appears from seven to thirty years of age, but there are cases in which it has appeared at forty and fifty. The first symptoms are ordinarily a lack of the transpiration of the perspiration of the feet and legs with increased sweat on the rest of the body, dryness in the nasal fossæ, and falling of the external parts of the eyelids. Accompanying these phenomena are a burning sensation in the members of the body and a little anæsthesia.

3.—The greater number of cases occur in youth or at a mature age. The diseased who suffer from the macular form die within ten years, counting from the date of the appearance of the disease; those from the tuberculous form within fifteen years, and those with the anæsthetic form may linger for thirty years or more.

4.—The “Mal de S. Lázaro” is more frequent in the masculine sex; in the proportion of eight to five.

5.—No preference of this disease has been noted for any special race or color; except, it may be stated, that no negro with this disease has yet presented himself at this hospital.

6.—The “Mal de S. Lázaro” afflicts almost entirely the poorer classes of the people, and generally affects such persons as frequently expose themselves to moisture and heat alternately.

a.—It is most frequent in small populations, and in the country, in places near to the coast, in the bays and in moist and marshy spots.

b.—The condition of the dwellings may have some influence over the development of this disease, taken in connection with the substance of the reply in No. 6.

c.—The habit of taking considerable alcohol appears to influence the development of the disease in persons predisposed to it.

d.—The larger number of cases of "Mal de S. Lázaro" are noted in those places where pork is much used for food.

e.—The "lázarinos" (lazars or lepers) are mostly herders, outdoormen, or laborers who are for the best part of their lives close to a fire, and frequently exposed to the cold air and dampness. Abuses of all kinds, excesses in eating and drinking, exposure to intense heat and cold encourage the symptoms of the disease and hasten its fatal termination.

8.—The "Mal de S. Lázaro" is hereditary, and is assuredly transmitted by the mother; but if the mother is healthy it has not yet been determined how it is transmitted. I know a family in which only one of its members has any symptoms of "Mal de S. Lázaro" of the anæsthetic form; the family consists of four persons. The father died of the disease, the mother is healthy.

9.—I do not believe this disease has any connection with syphilis. Anti-syphilitic treatment breaks down.

10.—There is not a single case of contagion either direct or through proximity to the disease.

a.—(No reply).

b.—(No reply).

c.—There has been no case of transmission of the disease by sexual intercourse.

11.—Those sick from this disease, of both sexes, are placed in different wards.

12.—There was formerly a special hospital for those suffering from this malady, but now they occupy wards in a civil hospital.

The sanitary conditions of the hospital in which they at present reside are good. The sick occupy rooms well ventilated and ample in size, and have also an open yard or garden, in which they can spend a few hours of the day according to the directions of the medical attendant.

13.—Ordinarily there are thirty patients in the two wards.

14.—This malady has been known in Mexico from the time of the conquest, since Hernan Cortés founded a hospital specially for the lazars. As regards the increase or decrease of this malady there has been no notable change.

15.—The only favorable results obtained have been an alleviation of the sufferings of the sick. Hygienic measures are very useful and necessary. Nitrogenous food and the deprivation of all alcoholic beverages have also been found beneficial, and with respect to the medicinal treatment, outside of the symptomatic, I have only noted any decided improvement when the sick have been treated by the Sudorific method, with hot air and vapor baths and by the administration of medicines which directly excite the perspiratory glands.

I have never seen a spontaneous cure of this malady.

During the whole of the time I have had charge of the lazar department (twelve years) not a single case has been restored to health, except one of the tuberculous form to which supervened intense albumenuria, and having treated this latter disease with appropriate remedies, the patient was cured of it, and at the same time there was noted a suspension of the "Mal de S. Lázaro," the reabsorption of the obstinate tubercles and the general aspect of the patient differed from the rest. This patient remained in a satisfactory state for eighteen months, and died at the end of that time in consequence of an attack of pleuro-pneumonia.

(Signed.) DR. JOAQUIN M. GOMEZ,

In charge of the Lazar Department of the Juarez Hospital.
Mexico, April 27th, 1885.

MEXICO.

FROM THE SUPERIOR COUNCIL OF HEALTH, MEXICO.

[Received February 14th, 1866.]

1.—Leprosy has been known in Mexico from very remote times, and it exists in the present day.

a.—There are three different forms of leprosy in Mexico known under the following names: the macular form, the tuberculosa, and the anæsthetic; and even the common people distinguish them by

giving the name of *leoninos* to the tuberculous, *antoninos* to the anæsthetic and *lazarinos* to the macular form, using, at times, the last to designate the three forms.

b.—In the opinion of the Council they are varieties of one morbid state, although the symptoms, defining them, differ to such an extent that a superficial observer, or one who has not seen a large number of cases, might consider them as distinctive forms of one morbid entity, if not as entirely different diseases.

c.—*Elephantiasis tuberculosa* is characterized by the presence of tubercules in the skin of the face, of the arms and the legs, especially in the trunk. These tubercules are sometimes found ulcerated in a special manner.

Elephantiasis anæsthetica is characterized by the lack of sensibility, more or less complete, of the extremities of the members, and more than all by the elimination of the proportions of the necrosed bones, or by the re-absorption of the bony tissue in these same extremities, by the atrophy of the muscles of the thenar and hypothenar eminences, and by the re-absorption of the lower tarsi of the eyes. The insensibility although most strongly marked in this form, is not exclusive to it.

The macular form has for its special characteristic the presence of red and painful maculæ in the legs and arms, exceptionally in the face and very rarely in the trunk; these maculæ resolve or ulcerate leaving then peculiar cicatrices.

2.—According to our observations the age at which it manifests itself is from eleven to twenty-five years. The earliest symptoms are different in each of the forms in which the sickness is seen; thus in the macular form in the earliest beginning of the disease, when even not defined, there is generally a suppression of sweat, numbness and formication in the hands and feet, which in a little time spreads to the rest of the members, which symptoms precede the anæsthesia which becomes more or less complete although the anæsthesia is analgesia, because the sensibility of touch although imperfect is conserved throughout the whole sickness. Afterwards follows the falling out of the eyebrows, eyelids, and the hair of the arms and body, and extremely rarely that of the head; there presents itself also the drying up of the nasal mucous and obstruction of the nose. Generally the suspension of the sweat, the insensibility in the members, the drying up and obstruction of the nasal fossæ are the early symptoms of this form which becomes marked in two or three years by the appearance of maculæ.

In the tuberculous form the same symptoms present themselves as in the former. Suppression of sweat, anæsthesia although not marked as in the macular form, the dropping out of the eyebrows and of the soft hair, although the dropping of the former is not so complete, some hair always being preserved in the inner side of these, and it appears that the falling out is in proportion to the number of tubercules which make their appearance; on the breast of the tuberculous there may be found soft hair, on that of the macular form, never. After a longer or shorter period appear the characteristic tubercules; by mere sight these cannot be recognized; but if the hand is passed over the skin where they are about to appear, the inequalities presented are noticed; they are liable to appear, sometimes on the lower or upper limbs, and at other times on the face, where they are constant when the disease is in its complete development; in this last case they commence by the eyebrows (when fallen) and by the lobe of the ears, its volume varying from the size of a pin's head to that of a bean.

In the anæsthetic form is presented the lack of sweat with the same conditions as in the preceding forms; but the sensibility (analgesia) reaches a maximum at such a degree that very rarely some of the diseased are noted as having burned scars caused by placing the members to the fire and sometimes so intense, that the cellular tissue and the muscles, and the inflammation developed are found carbonized, which from the burn causes an intense pain in the persons who have not felt the action of the fire. In this form there is no alopecia, there is no deformity in the features; but there are two notable symptoms, the fissures in the soles of the feet, which appear very early and great white maculæ, true discolorations of the skin, of the trunk, arms and head, which when it shows have a tendency to spread, the skin in its neighborhood assumes a roseate color which is not seen when they are stationary.

3.—The period of life when the disease generally appears is at puberty, although exceptionally it presents itself in childhood. In the macular form the duration is very variable but as a rule ranges from six to eight years, rarely more. The tuberculous continues from fourteen to twenty years, and the anæsthetic up to thirty years. Death is the usual end of these three forms, and supervened through the lesions caused by them or by the complications to be hereafter spoken of.

4.—In regard to the sex there is no difference in frequency

with which the disease appears, since in the hospital there is almost always an equal number of men and women.

5.—The black race is not scattered through Mexico where the hybrid and pure indigenous races predominate; in them leprosy is most frequent, but the whites are not exempt.

6.—In Mexico it prevails among the poor. Among the causes of the disease we ought to count in the first place, heredity, then comes the action of moisture; dwelling in the damp places, the repeated action of the water on the body appears to favor the development, thus, almost all of the diseased have noticed the first symptoms of the disease appear after a heavy rain; but we believe that perhaps it is necessary to have a certain condition of climate which makes the action more energetic, because in the north of this Republic there are cold and damp places in which it may be said that the disease scarcely exists at all, and, on the contrary, in the south it is much more common where the temperature is much higher, therefore we believe that the elevation of the temperature united to the moisture of the atmosphere are favorable conditions for the development of leprosy.

7.—The observation of the sick is made in the Capital whence they come to be healed principally from places situated at a short distance, as Chalco, Santa Arita, Yxtacalco, Mexicalcingo, Ayatha; the most part of these places are low, damp, and situated on the banks of streams or lakes; some may be considered as rural and others as urban, but subject to malaria. The majority of the inhabitants have their dwellings damp, their laborers consequently are in a bad hygienic condition, badly clothed and badly fed, and most parts of this Republic in which the malady has been observed, as dominant, are found to possess analagous circumstances.

8.—Generally up to the very last moment the disease becomes more aggravated, the malady is also developed by a neglect of the hygienic methods, and the influence of this is such that the diseased who leave the hospitals much improved in health return after a few days much worse, without this aggravation can be possibly attributed to the natural course of the disease, it is due to the derangement of their habits. It is probable that alcoholic excesses contribute to the aggravation of the malady.

9.—The malady is frequently hereditary, the influence of the maternal hereditariness being more notable than that of the paternal. We do not know any family where one member only has

been affected while all the other members remained free, but we have known families in which some have been attacked and others not.

10.—There is no reason to believe so, in substantiation it might be said that there have been cases in which syphilis has attacked lepers, and followed its regular advance without interfering with the leprosy which has continued its ordinary advance after syphilis has been cured.

11.—Up to date we have no proof that the disease is communicated by direct contact between healthy persons with the diseased, nor to those who come in close proximity with them. Not one of the cases that have been observed would incline one to believe that it is transmissible by sexual intercourse.

12.—To-day persons afflicted with the disease are permitted to communicate freely with the people without any restriction whatever, but in very early times they were segregated in a special hospital.

16.—Anciently, there was in this city a hospital exclusively dedicated to lepers, but it has been suppressed altogether for more than twenty years. Since that time a special department has been instituted in the Juarez Hospital, consisting of twenty beds for men and as many for women; but in other hospitals there are several afflicted with this disease who are scattered around without any law interfering with them.

16.—Benevolence maintains those who are treated in the Juarez Hospital, and also those who are found scattered around in the other Hospitals, and there is no fixed number, for all who apply are admitted.

15.—The malady has existed in Mexico from a period anterior to the conquest by Fernando Cortés, and the Conqueror believed it to be necessary to establish a hospital especially for lepers; but in the seventy-five years that we have been independent, we believe the number of lepers has decreased, because the public necessities are amply covered by the before mentioned department of the Juarez Hospital, and in the case of the few sick in the other hospitals, notwithstanding the daily increase in the general population. As regards the causes which have produced this diminution of the disease we are unable to designate them.

16.—We do not know of an instance of a spontaneous cure of the malady, in the absolute meaning of the word.

A substantial and strengthening food, composed principally of flesh, farinaceous food, and milk as a dietetic regimen, has given good results; where the lepers have been treated in a moderate temperature, in dwellings with a good location, well ventilated and dry, a noticeable improvement has been observed.

In the medical treatment there has been employed successively and without result, mercurials, *hidrocotila sciatica*, guano, yodadurados, arsenic, sarsaparilla, and tarantula as diaphoretic measures.

In the civil practice of Drs. Liciaga and Reyes it was observed that in the first four cases in which very good results were obtained, the oil from the seeds of the *gynocardia odorata chalmogva* was used internally and externally, and in other four cases a notable improvement was obtained by the use of the fluid extract of *rhus bituminosus michoacanense*.

In one of the cases it was noticed that eight years after the treatment not one of the symptoms of the disease had returned.

17.—No census has been taken recently; the population is estimated at 350,000 inhabitants.

18.—There exists a general and uniform register of births and deaths, together with the causes of death from the year 1866 to date.

19.—We have not sufficient data to reply to this question with exactness, but there are some small populations in the east and south-west of the Republic where the disease, it is noted, presents itself with greater frequency.



NETHERLANDS AND COLONIES.

DR. VAN DEVENTER, AMSTERDAM. DIRECTOR OF THE SUBURBAN HOSPITAL.

Leprosy occurs not only in the Netherlands, but also in the East and West Indian Netherlands' possessions.

The disease presents itself in the three forms of *maculosa*, *tuberculosa* and *anæsthetica*.

The persons in whom leprosy is observed in the Netherlands, are such as have returned from the East or West Indies. I have noticed unmistakable symptoms of leprosy on such persons, at times on their landing, and at others not until two years afterwards.

Most of the patients declared that they had never known themselves to have been in contact with sufferers from leprosy; neither did they know what leprosy was, nor had they ever met with lepers at all.

In the East and West Indies leprosy is endemic, but whilst the disease is of more frequent occurrence in the Moluccas than on the Island of Java, it is not epidemic in the latitudes first mentioned, the number of sufferers there being always very small.

At one time when leprosy was held to be infectious, persons afflicted with the disease, both in the Netherlands and the Colonies, were isolated either in special institutions or even on certain islands dedicated for that purpose.

Now-a-days such isolation has ceased to exist, no restriction being put upon the leper's liberty.

The old leper houses in the Netherlands have long since been converted into hospitals for chronic diseases, but in the pauper Colonies of Ommerschaus and Vrenhuisen there is a shed or special ward affording accomodation for twelve persons: though as a rule no more than six beds are occupied. This establishment dates from the year 1867, when in a casual way some lepers were discovered among the returned and pensioned soldiers from India in Brombeck Asylum. These were transferred to the new establishment in which they were all treated separately.

In the few Indian Islands set apart for the treatment of lepers, and still open to persons so afflicted if they choose, the sufferers are living together. These lepers produce perfectly healthy children, out of whom are sometimes born leprous infants. This proves the hereditary tendency of leprosy—at least in the form of atavism.

Since the lepers are no longer compelled to live in isolation, one does not notice any dread of contagion among the native population of the Indies; the people move amidst them as if they were healthy persons.

Only in cases of *lepra mutilans* is the patient avoided on account of his unsightly appearance. In the Netherlands persons attacked with leprosy are admitted to the common hospitals, where they are ranged by the side of other patients.

Not one case of contagion has ever been recorded.

Leprosy shows itself among children as well as among adults. In the Indies the disease may last for five years—then it ends fatally. In the Netherlands it continues much longer, up to fifteen years.

Leprosy is found equally amongst Europeans, Chinese, Arabs and native Indians; it is more prevalent on the seaboard than in the mountain ranges. In some families though both parents were pure Europeans, and had never been in India before, one of many children was seized with leprosy without any assignable cause for the phenomenon.

It cannot be proved that leprosy is in any correlation with such other diseases as syphilis, framboesia, etc.

The therapeutic as well as the *dipterocarpic methods of treating the disease, have been hitherto ineffectual.

In the case of a child, Dr. Van der Star, privat-docent in dermatology, saw a case of leprosy yield, but atrophy of the skin and stenosis of the mouth set in. On other parts of the body the blotches dissappeared, but atrophy of the skin remained.

The causes of death from leprosy are exhaustion, tuberculosis, diabetes, enteritis and others.

**Dipterocarpus* (Bot). A genus of trees found in the East Indies, which afford an abundance of resinous juices.

THE NETHERLAND'S COLONIES.

THE MINISTER FOR THE COLONIES, GRAVENHAGE.

In response to the request contained in your letter of May 16th, paragraph No 45 w., I have the honor to communicate to Your Excellency the following answer to the enquiries of the Consul for Hawaii at Amsterdam, in his letter of May 13th, E. C. No. 22., concerning the occurrence of leprosy in the Netherland's Colonies.

1.—To what extent does leprosy prevail in the Netherlands and its Colonial possessions? Complete information cannot be given because it is only the number of patients in the hospitals that is known. It

may however be stated that the disease appears in all parts of the Indian Archipelago except the little Sunda Islands. and the northern part of Celebes, also in Surinam and Curaçao.

2.—Previous to 1865 there were in the Netherlands East Indies, local and provincial regulations enforcing separation for lepers. In 1868 however, because it was thought to be proved after long experience, that leprosy must be considered to be not contagious, it was determined on the part of the Government that there was no reason for forcing the lepers to separate themselves in the hospitals, or dwell in restricted places. In Surinam the matter is regulated by the Ordinance of 1830, (Government paper No. 13) modified by the Ordinances of 1831, (Government paper No. 12), 1834 (Government paper No. 13), and 1853 (Government paper No. 2); in Curaçao by the Proclamation of 1830, No. 148 and 1864, No. 7.

3.—In the East Indies separation of lepers is not enforced, (compare the second question). In the West Indies, where the disease is considered to be contagious, separation is carefully enforced. Persons suspected of this disease who go among the public are arrested by the police and thereupon examined by a special Medical Committee. If they are found to be infected they are sent to the establishment set apart for the purpose. In the Colony of Curaçao they go a step further than in Surinam, by removing infected persons to the Asylum, even if they have not gone among the public.

4.—In the East Indies there yet existed in 1865 fourteen Asylums for lepers, but in consequence of the regulation of that year, eight of them were gradually abolished. The six which still exist serve for voluntary Asylums for lepers. In Surinam there exists one Asylum for lepers, in Curaçao three. The annexed table gives a list of the Asylums with a statement of the number of patients, and of the manner in which they are supported.

5.—As has been said above, they think in the East Indies that leprosy is not contagious, and in the West Indies that it is. The natives in the Netherlands Indies are indifferent in regard to the disease.

Copies of the Surinam Government Papers, and the Curaçao Proclamations, referred to above, are enclosed.

The Minister for the Colonies.

(Signed.)

SPRENGER VAN EYK.

To His Excellency The Minister of Foreign Affairs.

ASYLUMS FOR LEPERS (VOLUNTARY) IN NETHERLANDS EAST INDIA.

ASYLUMS AT.	Number of Lepers at the end of the year 1883.	The Expenses are Paid by
Pelantoengan (Samarang)	36	The Government.
Lowano (Djohjokarta)	39	Contributions of prominent persons of Java.
Wangkoeng (Soerakarta)	65	Idem.
Benkoelen	12	The Government.
Kemang Pampang (Palembang)	22	Idem.
Tandjong Pinang (Riouro)	15	By Chinamen. The servants are paid by the Government.
Total	189	

ASYLUMS FOR LEPERS IN NETHERLANDS WEST INDIA.

ASYLUM.	Number of Lepers	Expenses are Paid by	REMARKS.
Establishment "Batavia" on the Coppename (river in Surinam).	102†	The Government.	†At the end of 1883 there were 37 European lepers, 56 natives and 9 immigrants from British India.
On the Island Curacao.	13‡	Idem.	
" " St. Martin.	10‡	Idem.	
" " St. Eustatius.	19‡	Idem.	‡At the end of 1884.

NORWAY.

FROM SOREN CASPERSEN ESQ., CONSUL GENERAL FOR SALVADOR,
CHRISTIANIA, NORWAY.

.—Yes.

a.—There are two different forms of leprosy known by the names of *glad spedalskhed* (glat smooth spedalskhed leprosy—Elephantiasis lavis and *knuded spedalskhed* knuded, Knotty, Cunyry)—Elephantiasis tuberculosa.

b.—These two forms are varieties of the same disease and are often found in the same person, the disease beginning with one form and afterwards developing to the other.

c. 1—*E. lavis*—spots (maculæ) of various sizes and shapes, of a reddish-purple color and often combined with the loss of feeling (anæsthesia).

2—*E. tuberculosa*, knots or lumps (tubercula) of the size of a pea to a Spanish nut, sometimes spread over various parts of the body, sometimes confluent to larger masses, especially in the eyebrôw and other parts of the face,

2.—The disease generally manifests itself in the mature age, but appears also in children. The earliest symptom are usually a change in the person's temper and mind, a change in the features of the face and then the appearance of maculæ or tubercula.

3.—The disease attains its full development in the mature age. The following table shows the age of deceased lepers in Norway in 1880:

Age of the deceased.		Men.	Women.	Both sexes together
11 to 15	Years old.....	1	.....	1
15 to 20	" "	2	4	6
21 to 30	" "	17	8	25
31 to 40	" "	16	10	26
41 to 50	" "	24	8	32
51 to 60	" "	19	9	28
61 to 70	" "	8	7	15
71 to 80	" "	4	5	9
81 to 90	" " .....	.....	2	2
91 to 100	" " .....	.....	1	1

4.—No.

5.—There is no colored population in Norway.

- 6.—Nearly only amongst the poorer classes.
- a.—The disease appears only along the sea coast and its immediate neighborhood. The district is mostly hilly, rocky and dry, malaria is not known in Norway.
- b.—The sanitary conditions of the dwellings are as a rule good.
- c.—The personal cleanliness is not always as good as it ought to be.
- d.—The ordinary diet is fish, often salt or dried, but seldom or never rotten, potatoes and porridge, prepared of barley-meal and water.
- e.—Fishermen, sailors and small farmers.
- 7.—Drunkenness and want aggravate the disease.
- 8.—The disease is very often hereditary. Yes.
- 9.—No.
- 10.—No.
- 11.—Yes. The only restriction is that, when lepers are so poor, that they want public support, they are obliged to seek it in public asylums, and are not supported in their homes in the parishes as other poor.
- 12.—There are public asylums where all lepers that seek admittance are received free; in these asylums marriage of course is prohibited, and the two sexes kept apart. Lepers are also admitted into general hospitals, but then only when suffering from other diseases.
- 13.—In 1880, 617 in public asylums.
- 14.—The disease is diminishing yearly. The higher civilization, better sanitary habits, and the public asylums, contribute to the diminution.
- | | |
|--|--------|
| The known number of lepers was in 1856 | 2,113. |
| “ “ “ 1860 | 2,068. |
| “ “ “ 1870 | 2,055. |
| “ “ “ 1880 | 1,606. |
- 15.—In 1880 of the 617 lepers in the public asylums seven recovered. From 1857 to 1879 one hundred and two are known to have recovered.
- 16.—1,851,438. The last census was taken the 31st of December, 1875, for the provinces; in Christiania every year.
- There is a general registration of births and deaths, including the cause of death. Such a registration has been kept for centuries. Births and deaths by the parish clergyman, the causes of death by the physicians.

17.—The following table shows the distribution of lepers in the provinces in Norway the 31st of December, 1880, and the population of the provinces:

Provinces.	Population	Men.	Women.	Both sexes
City of Christiania.....	119,407*			
Smalenems.....	107,804			
Akershus.....	97,550		1	1
Buskernds.....	102,186			
Jarslberg and Laurvig.....	87,506	1		1
Hedemarkens.....	120,618	3	3	6
Christians.....	115,814	3	2	5
Bratsbergs.....	83,171			
Nedenos.....	73,415			
Lister and Mandals.....	75,121	4	1	5
Stavanger.....	110,965	49	40	89
South Burzentrus.....	114,560	74	90	164
City of Berym.....	38,573	11	11	22
North Burzentrus.....	86,208	117	100	217
Romsdals.....	117,220	82	55	137
South Throndhjems.....	116,804	58	42	100
North Throndhjems.....	82,271	51	35	86
Nordlands.....	104,151	79	50	129
Tromso.....	54,019	13	14	27
Trumarkens.....	24,075			
		545	444	989
In the public asylums.....				617
In the Kingdom of Norway....	1,851,438			1606

*The population is in Christiania from the census of 1880. From the provinces 1875.

SIAM.

FROM A. KURTZHALSS ESQ., HIS HAWAIIAN MAJESTY'S CONSUL AT BANGKOK.

To His Excellency WALTER M. GIBSON,

Minister of Foreign Affairs, Honolulu.

YOUR EXCELLENCY: Since my most respectful letter of the 15th of September, 1884, I have had the honor to receive Your Excellency's despatch of the 28th of December, 1884, referring to leprosy in Siam to which I beg to reply as follows:

I have consulted with the first medical European and the first medical Siamese doctor of the place, and their information concurs with the result of my own experience of many years residence here, namely:

1.—Leprosy prevails but very slightly in Siam, more so amongst the Chinese than Siamese population.

2.—It has not yet been the subject of special legislation in Siam.

3.—The Government of Siam does not enforce segregation of lepers, but there exist certain temples here, the priests of which specially devote themselves to attending to paupers and lepers by supplying them with food and allowing them to camp on the premises of the temple.

4.—No royal or private hospitals or asylums for lepers exist in Siam as far as my informants and myself are aware of.

5.—The prevalent popular opinion as to the contagiousness of leprosy is, that the disease is not catching. I have many times seen families sitting together or people crowded in a public gambling or other house amongst whom was a leper, and no notice was taken of him. The Siamese as well as the Chinese assert that the disease is hereditary but not catching, and are therefore not afraid of being near a leper.

I have the honor to be Your Excellency's most obedient servant,

(Signed.)

A. KURTZHALSS,

Consul.

SPAIN.

REPLIES TO INTERROGATORIES REGARDING LEPROSY, GIVEN BY THE
FACULTY OF THE HOSPITAL OF THE HOLY CROSS
OF BARCELONA.

The Faculty of this Hospital to whom was handed the collection of questions presented through you in order that they might formulate their opinion and consider the replies which they ought to give to the formulated questions have discharged their duty in the following manner:

This Faculty having carefully studied the collection of questions regarding leprosy, opportunely forwarded through this Honorable Department at the request of the Consulate General of Hawaii in Spain, before replying to any of the questions which are therein framed, believe it to be a duty to inform the Honorable Administration that the actual rarity in Barcelona of the disease which appears destined to disappear from the people with the advance of civilization, and the assiduous cultivation and perfecting of the practices of hygiene, prevents this faculty from replying to all the questions propounded as they desired. The scant number of cases which they are enabled to observe in the Hospital of Saint Lazarus, devoted to lepers, as well as in private practice, the endemic form in which the same present themselves, are circumstances which make impossible the formation of a complete and exact judgment to practically elucidate certain questions relating to the epidemic and invading forms of this malady which in Spain, fortunately, we have had no occasion to watch.

1.—*a.* Leprosy is rare in Barcelona and in Spain, and generally presents itself endemically, and generally in the tuberculous form. One of the subscribers has seen in his private practice, *one case alone*, of leprosy of the anæsthetic form. To judge of the rarity of this disease it should be noted that in this Hospital of S. Lazarus, designed for lepers, there are in the whole year from four to ten admissions, some of them repeat the entries for the same sickness, and consisting for the most part of cases of Elephantiasis of the extremities, (Elephantiasis of the Arabs) accompanied by elephantinacial ulcers, that ought not to be considered as cases of leprosy.

2.—*a.* In reference to age they have presented themselves from twenty to forty years.

2.—*a.* From the few cases noticed it would appear to affect in greater proportion males than females.

10.—*a.* Have been unable to observe any case of contagion, but it must be taken into account that the malady has not presented itself under any other form than the endemic.

11.—*a.* For the preceding considerations communication between lepers and healthy persons is not restricted in Spain.

12.—*a.* The hospital which in Barcelona is designed for lepers, contains two wards exclusively; one for men and the other for women, entirely independent, having besides several accessory departments (refectory, kitchen, dwellings for employees, wardrobes,

offices, etc.) and forms a branch of the Hospital General of the Holy Cross. It has for attendance on the sick a Sister, one male and two female nurses, and the medical assistance is under the charge of the supernumary physicians of the Hospital of the Holy Cross who take it by monthly turns.

13.—*a.* It is difficult to be able to exactly compute the number of lepers in Barcelona, it is safe to say they are very scarce. At the Hospital, from one to three a year present themselves.

15.—*a.* A great number of medicines have been tried to combat this disease, but in almost all cases without result, except that the iodic treatment, internally and externally, appears to have given some result; but as this affection always presents itself in light forms, the patients are allowed to come and go from the Hospital without an opportunity being afforded for the completion of observations. At any rate it ought to be stated that of the number of deaths that have taken place in the Hospital of St. Lazarus, there have not been any resulting from leprosy but from intervening diseases.

The patients are afforded a good hygienic and dietic regimen, and allowed to be up all the day and walk about, are kept in perfect cleanliness of body, and supplied with healthy food and of good quality, without making any predilections in regard to special nutritious aliments whose use is permitted under the authorization of the Faculty. This is about all that has been observed with the small number of lepers. It may be stated that this Faculty regarding this collection of questions propounded by the Consul General of Hawaii, and in their answers thereto have held to the practical character of the questions, and avoided entirely any scientific digression on the said subject.

By resolution of the Faculty this is addressed to your honorable department as the result of their deliberation.

I have the honor to present it to you, with the sincerest hope, that it may be of some use in connection with the humane intentions which animate the Hawaiian Government. God preserve you for many years.

(Signed.)

JUAN COLL Y PUJOL,

The Administrator in charge.

BARCELONA, September 12th, 1885.

UNITED STATES OF AMERICA,

REPORT OF THE AMERICAN DERMATOLOGICAL ASSOCIATION.

In the transactions of the American Dermatological Association for 1883, a report by Drs. Fox and Graham is given which embodies the results of their combined investigations. The following ten propositions were submitted by them as their deductions from the facts observed:

1.—Leprosy is a constitutional disease, and in certain cases appears to be hereditary.

2.—It is undoubtedly contagious by inoculation.

3.—There is no reason for believing that it is transmitted in any other way.

4.—Under certain conditions a person may have leprosy and run no risk of transmitting the disease to other of the same household or community.

5.—It is not so liable to be transmitted to others as is syphilis in its early stages. There is no relation between the two diseases.

6.—Leprosy is usually a fatal disease, its average duration being from ten to fifteen years.

7.—In rare instances there is a tendency to recover after the disease has existed for many years.

8.—There is no valid ground for pronouncing the disease incurable.

9.—Judicious treatment usually improves the condition of the patient, and often causes a disappearance of the symptoms.

10.—There is ground for the hope that an improved method of treatment will in time effect the cure of leprosy, or at least, that it will arrest and control the disease.

IOWA, ILLINOIS, MINNESOTA, WISCONSIN.

EXTRACT FROM REPORT OF THE STATE BOARD OF HEALTH OF IOWA ON
LEPROSY; J. F. KENNEDY, M. D., DES MOINES,
SECRETARY. 1885.

In March, 1883, a letter from Dr. F. Eklund, Stockholm, Sweden, was received at the office of the State Board of Health, making inquiry as to the number of lepers in Iowa. This was the first intimation that the disease existed in the State.

An investigation was made resulting as explained in the following correspondence:

DECORAH, IOWA, August 29th, 1883.

Dr. R. F. Farquharson, Des Moines, Iowa.

DEAR DOCTOR:—Your letter to Dr. Bulis regarding leprosy in this country was referred to me for action, and in reply will say: I interviewed all the prominent Norwegians living in our city, and who are thoroughly acquainted through the whole county, also having been in the practice of medicine in this and adjoining counties for twenty-seven years, but had never heard of a case of leprosy. Not being able to get any definite information I was about giving up the inquiry when the thought struck me to see our County Auditor, Mr. Egge, a Norwegian, and he informed me, when he was a small boy, one day Dr. J. A. Holmboeck and Rev. Wm. Koren, from Bergen, Norway, dined at his father's house. Dr. Holmboeck was looking up cases at that time, and they were talking about it. Thus getting a clue, I drove out to the house of Mr. Koren and gathered the following information from him:

He stated that in the year 1863 Dr. Holmboeck visited this country and made an inspection through it regarding leprosy among the Norwegians. Both gentlemen were familiar with the disease in Bergen, Norway, a hospital having been erected there two hundred years ago. The doctor asked Mr. Koren for information, and Johannes Simonsen was pointed out to him. Simonsen was then living on East Prairie, but is now living in Military township, two miles north of Ossian. Both gentlemen knew him in Norway. (This is Hoelm-

boe's second case). He is seventy-five years old, comes from a leprous family, but he has never had any symptoms of leprosy, nor any of his family.*

The Doctor witnessed the death by leprosy of one man twenty years ago, and he is thought to have been Knud Ericksen, the party you mentioned as living in Locust Lane.

Mr. Dale, of Madison township, was also from a leprous family, but it never developed in his case, nor any of his family. He died a number of years ago.

Mr. Koren further stated that he had had a case in his congregation—a certain N. N. Romme—who died April 6, 1877. He had lived in this country fourteen years before the disease made its appearance. He was a horse doctor, camped out, and lived on poor food. None of his family, however, have been affected.

I saw another case, said Mr. Koren, and think that it was the same one that Dr. Holmboeck saw die twenty years ago.

The Rev. gentleman further stated that for thirty years he has traveled all of northern Iowa and southern Minnesota, and with three exceptions, he has never seen nor heard of another case, and it is his opinion, as it is also mine, that there is not a single case of the disease in northern Iowa or southern Minnesota.

Respectfully yours,

R. SMALL, M. D.
Health Officer, Decorah.

DES MOINES, August 31, 1883.

F. Eklund, M. D., 8 Sheppeholm, Stockholm, Sweden.

DEAR SIR:—Your kind favor of the 31st ult. came duly to hand, and you will please accept my sincere thanks for the information afforded. Following the clew given in your letter, I have investigated the matter, and with the following result:

In 1863, the time of the visit of Dr. A. J. Holmboeck, the Rev. Mr. Koren, was the Norwegian clergyman in Winneshiek county, and from him the following was learned:

1. Johannes Simonsen in 1863 lived on East Prairie, and was pointed out to Dr. Holmboeck by the Rev. Mr. Koren, as of a leprous

*There is some error here, for Dr. Helmböe knew leprosy well, and could not have been mistaken; neither could the patient recover—such an event being unknown. The mistake arises from the custom among the Scandinavians of transposing and repeating both Christian and surnames.

family; however, he has never yet had the disease, but is alive now, 75 years old, and in good health.

2. According to Mr. Koren, Dr. Holmboeck witnessed the death of a man by leprosy twenty years ago, and he thinks it was Knud Ericksen, of Locust Lane.

3. The case of Ljar Peterson cannot be traced.

4. Rev. Mr. Koren further stated that he had a case in his congregation, a certain N. N. Romme, who died April 6, 1877. He had lived in this country fourteen years before the disease had made its appearance. He was a horse doctor, camped out and lived on poor food. None of his family, however, had been affected.

The Reverend gentleman further stated that for thirty years he has traveled all of Northern Iowa and Southern Minnesota, and with these exceptions, he has neither seen nor heard of any other case, and it is his opinion that there is not a single case of the disease in Northern Iowa, or Southern Minnesota, and this opinion is endorsed by Dr. Small, Health Officer, Decorah, a medical practitioner of 27 years.

Yours truly,

R. J. FARQUHARSON,

Secretary.

DR. R. J. FARQUHARSON,

Secretary State Board of Health, Des Moines.

With the post of yesterday I have got in good order the valuable information that you have brought together and sent me concerning the fates of my poor leprous countrymen and brothers. A copy of your esteemed paper I send with the same mail to the honored society of Norwegian physicians for to be inserted in their transactions. Please accept my humble, sincere thanks.

With high esteem, your humble, obedient servant,

DR. F. EKLUND.

Sweden, Stockholm, 8 Shippeholm, 1883.

NORWAY, Minn., July 17, 1883.

Dr. Chas. N. Hewitt.

DEAR SIR:—In answer to enclosed letter from Dr. Eklund, Stockholm, Sweden, I have to state: Last year I sent a circular to Norwegian physicians and the Norwegian clergymen in this State, whose names I found on the roll of members in the yearly reports of their different synods, inquiring about the leprous they knew of, their

number and condition. I got answers from about twenty of the persons applied to, living in eleven of the densest populated counties, and I have reason to believe that they who did not return any answer, omitted to do so, because they did not know of any suffering from that kind of disease.

In the answers received, I got the names of three men supposed to be leprous, but to judge from the symptoms described, I would take only two to be suffering from the disease, and in the anæsthetic form, both natives of Norway. One had it already in the old country, but was first seriously attacked seven years after he came to this country, *i. e.* nine years ago. He has grown children, all well. The other had a brother who died of leprosy. He had no children. The third person named as infected is a native of Temtland, Sweden, but the symptoms described do not support the supposition of leprosy being the disease.

Besides these two (or three) I know of three more cases living in my neighborhood, one woman and two men. They have all brought the disease with them from the old country. Two of them have children, and one also grand-children—all of them are well.

In the course of the last ten years I have seen some other cases, who have applied for treatment, but they did not reside here, and I have lost track of them. Some of them belonged to another State, and were traveling for work. Within the same time five leprous have died in my vicinity, but in one of them (Prof. Wm. Boeck's observation No. 2) the disease had stopped years before. They were all men, three were not married; the other two left large families and full-grown children; one also grand-children. All of them are, as far as I know, in good health. Of the eighteen leprous Prof. Wm. Boeck met with, when he in 1869 and 1870, visited this country, four are marked down as living in Minnesota. Two of them (observation 2d and 3d) have since died, while one (observation 1st) is living yet. The fourth (observation 13th) I have heard nothing from.

Most likely there are several more leprous in the State than those above named, but it is not so easy to get the track of them. The population is moving, some few coming in every year mostly from the old country, many more going west. Many of those afflicted with the disease try to conceal it as far as it is possible. Even if they apply to a physician for relief, they will sometimes try to deceive him in regard to the nature and history of the case. When

questioned about the health of their relatives they will assert that they never knew of any leprosy among them; pressed closer, they will remember that an uncle or a brother has died in the leproserie.

The number of cases would, so it seems, be less every year, and the disease soon disappear, were it not for the new importations; the generations born in this country seem to be exempt. Under present circumstances, while the immigration continues with the same strength, as in the last generation, there is reason to believe that the disease will rather diminish than otherwise.

The immigration has been going on for about two generations, and been considerable in the last, while the disease in the later years, in the old country has been better controlled, and is steadily decreasing. In Norway at the end of 1878, the number of persons suffering from this disease was 1,681, while in 1874 it was 1,832, and in 1856, 2,113, which figures for the latter dates ought to be made larger yet, as the investigation then was not carried on as strictly as in later years, and many diseased were overlooked, who have been added to the number of the following years. It is then probable that we in the future will have fewer cases imported.

This my dear doctor is, although not much, what I have to remark in regard to the occurrence of leprosy in Minnesota, and in answer to the letter you transferred to me.

Very truly yours,

CHR. GRONVOLD.

Norway, September 11, 1883.

NORWAY, Minn., September 11, 1884.

Dr. Chas. Hewitt.

DEAR SIR:—In answer to Dr. Farquharson's inquiries, I have the honor to report, that of the eighteen cases Prof. Wm. Boeck, in 1869-70, found in the three Northwestern States,

4 were living in Minnesota,

3 were living in Iowa,

2 were living in Illinois,

9 were living in Wisconsin, if Highland Prairie is there, for one.

That is all the locality named.

The 3 cases in Iowa were:

Anæsthetic form. Boeck, 7th observation. *Edward Wilson Turaldsgaard*, Winneshiek county, Hesper township, was then (1869), 23 years old, two years in America; brought the disease with him from

Norway, where he got it nine to ten years before. Had in that country leprous relatives.

2. *Mixed form.* Boeck, 9th observation. *Ole Torkildson Fosae* is put down as living in Minnesota, Winneshiek county, Pleasant township, but as there is no county of that name in Minnesota, he belongs most likely to Iowa—then thirty years old; got the disease three and one half years after the arrival in this country; had in the old country leprous relatives.

3. *Anæsthetic form.* Boeck, 10th observation. *Ole Iverson Dale*, Winneshiek county, Iowa. Then, in 1869, forty-three years old; brought the disease with him from Norway. Does not know of any leprous relations.

These are the three (3) cases I find in Prof. Boeck's report, residing in Iowa. But as it is thirteen (13) years ago, they may be dead, all of them, or gone West somewhere else.

Of the four (4) Prof. Boeck found in Minnesota, three are dead (I have now traced the third, also), while one, as far as I know, is alive yet.

The report I speak of, and from which I have taken the above, is written by Prof. Wm. Boeck, Christiania, Norway, some years after having returned from America.

It is written in the Norwegian language. I have one copy in my possession, and shall be happy to give you any information out of it that you may wish.

Dr. Boeck did not believe in contagion, and explains the disease as depending upon heredity, in the three cases above, as in the rest of the lepers he found here, with the exception of one, "where we might think of contagion, as there are found no lepers in the family," as was stated; but then he adds: "All that we have observed in our country has, so far, kept that (contagion) away from our thoughts, but I am not, therefore, blind to facts. Although the experience on the Sandwich Islands, Madagascar, and other places, seems to demonstrate the contagiousness of the disease, scientifically speaking, and practically too in many places, specially in tropical seashores and islands, there seems in the light of existing facts to be very little risk of the disease spreading by contagion in our country, and what little risk there may be of contagion, will probably be completely removed by regard to the common rules of cleanliness."

Respectfully yours,

CHR. GRONVOLD,

Among the deaths reported from Story county for 1883, was one caused by *Elephantiasis græcorum*. A request was sent to the attending physician to furnish a history of the case, to which he made the following reply:

NEVADA, Iowa, February 21, 1885.

L. F. Andrews, Secretary State Board of Health.

DEAR SIR:—In answer to your inquiries regarding a case of leprosy in this county, I have ascertained that Ole K. Hill came from Olen (pronounced nearly like "Airlen"), District of Bergen, Norway, in the year 1866. First located at Des Moines, and soon after at Cambridge, in this county. Upon his election as County Recorder in 1874, he came to this place, where he remained until his death, in 1883. In Norway his occupation was that of a fisherman. Was attacked with the disease about 1873, which he recognized at once, having been familiar with it in Norway. A sister (I think) died of it there many years ago. His was a typical case of the tuberculated variety of *Elephantiasis græcorum* (*lepra tuberculosa elephantiasis*) and therefore needs no special description.

His wife (an American lady) lives at Cambridge, Iowa. His father, mother, one brother and two sisters, live in this county (farm name-Haugé), and betray no symptoms of the disease.

Respectfully,

P. W. FARRAR, M. D.

Thus we have eight cases of leprosy in Iowa in the past twenty years, all now dead, the last dying in August, 1883.

These cases may be tabulated thus:

AUTHORITY.	YEAR.	COUNTY.	NO.	NAME.
Hoelmbæ.....	1863	Winneshiek.	1	Ljar Peterson.
Hoelmbæ.....	1863	Winneshiek.	2	Johannes Simonssen.
Hoelmbæ.....	1863	Winneshiek.	3	Knud Eriksen.
Koren.....	1877	.....	4	N. M. Romme.
Bæck.....	1870	Winneshiek.	5	Edward Nielson Taraldsgaard
Bæck.....	1870	Winneshiek.	6	Olo Torkinson Fosse.
Bæck.....	1870	Winneshiek.	7	Ole Iverson Dale.
Farren.....	1883	Story.....	8	Ole K. Hill.

In 1880 Winneshiek county had a population of 23,938, of whom 7,862, were Scandinavians (Swedes and Norwegians) numbering

4,095, or 52 per cent. . There were in the whole State 39,145 Scandinavians, so that Winneshiek county contained about ten per cent.

It may be thought by many that the danger from the spread of this disease is slight, but as Dr. Billings remarks: "the danger is no doubt small—that is to say there is a very small risk of a very great danger—but it exists, and now is the time to guard against it."

The causes of leprosy are believed by eminent writers and practical observers to be many and different. The modes of propagation may be reduced to two, contagious* and hereditary transmission-† That it is contagious, is evidenced by the established fact (Gradle) that it has a peculiar bacillus. If not, it is a strange exception to its kindred, glanders, tuberculosis, etc. But it is not contagious in the usual acceptance of the term. It requires actual inoculation of pus or blood into the circulation through open vessels or abraded surfaces, and there must then be a favorable cachectic condition to the action of the virus. Cohabitation is also a source of infection, so also "inhibition of the excreta of lepers."†

MASSACHUSETTS.

EXTRACTS FROM THE FOURTH ANNUAL REPORT OF THE STATE BOARD
OF HEALTH, JULY, 1883. SAMUEL W. ABBOTT, M. D., OF
WAKEFIELD.

In December, 1882, a former resident of Salem, who had been absent several years from his native city, chiefly at the Sandwich Islands, returned to Salem, having contracted leprosy during his absence. At the invitation of the local board of health, he was visited by members of the State Board, and also by Drs. White and Wigglesworth of Boston, who confirmed the diagnosis.

The statement of the leper, together with that of other persons who had known him in former years, showed that he had contracted

*Carter, Hillebrand, Wilson, Jones, Helmbœ. †Carter, Bœck, Virchow Danielssen. ‡Liveing.

the disease while living in Honolulu, and that it had first made its appearance upon him several years before he came home.

On his arrival in Salem in December last, the external marks of the disease were very evident. The skin of the face, especially of the forehead, the ears, the nose, and eyebrows, the hands and the feet, was greatly disfigured with tubercles of variable size. The skin of the thighs, the chest and abdomen was mottled and discolored. The toes were ulcerated and suppurating. The pharynx and the soft palate presented an inflamed and tubercular appearance. The voice was altered. His eyesight was also dimmed. The sight of one eye was gone, and he could only read coarse print with the other by means of a strong light. The large nodules were mostly devoid of feeling. His general condition was feeble. His appetite was impaired.

He was placed in the Salem almshouse in an isolated apartment, and soon after a temporary house was constructed for him outside the almshouse, where he remained, gradually failing, until his death in the following March.

Since the disease clearly comes within the meaning of the act relating to contagious diseases, and since no allusion has thus far been made to it in previous reports of this Board, a brief account of its history and prevalence may not be deemed out of place at the present time.

History.—The existence of leprosy may be traced backward into the remotest ages of written history. From its early existence in Egypt and Syria, it may be traced into Persia, Hindostan, Turkey, and also into all the countries of Europe. Emigration spread it widely from the east to the west, and from the south toward the north.

The return of the Crusaders appears to have played an important part in its distribution. In the thirteenth and fourteenth centuries there was scarcely a town in which it did not exist; and leper-houses were numerous where the order of St. Lazarus devoted their lives to the care of the sick. There were at one time nineteen thousand such houses in Europe intended for the isolation of the sick.

In all European countries it was the policy of Church and State, in the fourteenth and fifteenth centuries, to stamp out the disease. Bulls were issued by Popes, and stringent laws were passed as to the medical examination, condemnation and status of lepers. The

leper was made legally and politically a dead man. His marriage ties were dissolved, the services for the dead was performed over him, and he became an outcast. These measures had their effect in rapidly lessening the disease; but it has never been entirely eradicated from the nations of the earth.

In proof of an identity of type, at least for nearly four centuries, there is still in existence a painting by Holbein at Munich, dated 1516, representing a group of lepers. It faithfully portrays a man whose face is covered with round, reddish knobs. There are also other lepers in the group, in various stages of the disease, whose external characteristics agree very closely with the modern figures of Danielssen and Boeck, and the descriptions of our modern writers. Virchow says that these pictures must have been painted from studies of actual lepers in a leper-house of the mediæval period.

Present Distribution.—Leprosy is endemic at the present day in many parts of the inhabited world, under divers conditions as to climate, degree of civilization and habits of life.

It exists chiefly in India, China, the Malay Archipelago, Egypt, Palestine, Turkey, the Grecian Islands, the Coast of the Black Sea, certain Mediterranean ports, Spain, Portugal, Norway, Russia, Iceland, Scotland, Madeira, the Canaries, New Brunswick, Canada, Brazil, Mexico, Central America, Madagascar, Africa, Mauritius, the Seychelles, New Zealand, and the Sandwich Islands. It is increasing in Crete and the Sandwich Islands.

This wide distribution in many places where it had no ancient history is attributed to the tide of immigration which followed the era of Portuguese and Spanish discovery.

In North America, it is known at New Orleans, at San Francisco, Charleston, New Brunswick, and in Scandinavian settlements in the North-western States. Twenty cases have been observed at Sacramento, and several were returned from San Francisco to China by the health authorities.

A peculiar interest attaches to the history of leprosy as existing in the Hawaiian Islands, and also at Tracadie in New Brunswick.*

In consequence of its slow and insidious progress, it is not possible to fix the exact date of its first appearance at Hawaii. Its existence there may be safely stated as less than half century, and it had

*Although neither of these localities is within the limits of the United States, our commercial relations with these nations are such as to awaken a greater interest in their condition.

made but little progress until within the past twenty-five years. Its prevalence is now so general as to threaten the existence of the nation, which, from this and other causes, has diminished rapidly within the past century of its existence.

As a proof of national decline, may be adduced the vital statistics of the Islands:

†In 1870 the births were 2,413, and the deaths 3,819. In 1871, births, 2559; deaths, 3,502.

Here in a native population of but little over 40,000, we find an enormous death-rate, and an excess of deaths over births of 2,349 in two years, or 47 per cent.

Leprosy appears to be confined almost exclusively to the native population in the Sandwich Islands, a few foreigners only being affected.

* * * * *

United States.—Within the domain of the United States, leprosy has not at any point made active progress. The rapid immigration of the past two years must, however, introduce into the country a greater or less number of persons in the incubative or doubtful stage of leprosy. On our Eastern coast, such cases may be looked for among the Scandinavian immigrants, especially those from Norway, where there are still about two thousand lepers. These people have settled chiefly in the Northwestern States, Minnesota alone having 100,000 Scandinavian settlers. Thus far, however, leprosy does not appear to have found a foothold among them, and no persons born in the Northwestern settlements have as yet been found to be affected.

Dr. Bendeke of Minneapolis says: "It occurs in much less proportion here among the emigrants than in Norway; and I ascribe this only to the better hygienic situation of the people as to food, clothing, exposure, etc."

On our Western coast, the chief source of the disease is China. A leper hospital has been established at San Francisco, and fifty-two cases have been admitted in ten years, all of whom with a single ex-

†A typographical error in the Report of the Board of Health for 1870 gave eleven hundred deaths too many. This important mistake was discovered by Dr. Arthur Mouritz while compiling his Report. In regard to the numbers quoted it should be stated that in 1870-1871, the Islands were visited by a fatal fever. In the year 1872-1873 the deaths were 6,005, and the births 4,710, thus reducing the excess of 2,349 deaths over births to 1,855.

ception were Chinese; and no case has been reported of a native citizen of California acquiring leprosy.

Other foci of the disease have been observed at Charleston, S. C., and also in Louisiana. In the former city, Dr. Geddings has observed sixteen cases in the past thirty-five years, and published a report of the same in the Transactions of the International Medical Congress held at Philadelphia in 1876.

Occasional cases have also been reported in the Gulf States during the past and present centuries.

* * * * *

Leprosy has been recognized as early as the third year, but it is rarely diagnosticated before the age of puberty, from which time it occupies an average period of ten years in attaining its development. In the anæsthetic form the effect on the duration of life is not so marked as in the tubercular.

Lepers are very susceptible to the influence of colds, and are often affected with pulmonary diseases, erysipelas, nephritis and ascites, and succumb easily to a want of proper food.

Death usually takes place from intractable diarrhœa, or dysentery, either acute or chronic.

Leprosy in its relation to Public Health.—The questions which render leprosy a matter of special interest as affecting public health are those of etiology, modes of propagation, and the question of contagion.

The causes of leprosy have been sought for in the peculiarities of climate, soil, diet and habits of life. As regards climate and soil, the wide geographical distribution of the disease would seem to preclude them as elements or factors of causation. Opinions differ much as to the question of diet. The eating of tainted fish has been strongly urged as a cause. Leprosy is found in a most aggravated form among fish-eating people, as in Norway and Crete, and, on the other hand, it also prevails in inland districts where fish is but little used.

Doubtless an improper diet and bad hygienic surroundings aggravate the disease.

All these causes acting together for centuries did not produce the disease in the Hawaiian Islands, nor was it known there until some time after the islands were open to foreign trade and commerce with other nations. Hence it is reasonable to suppose that it was imported from other places. The first leper in Hawaii was not recog-

nized till 1853. The natives attribute its origin to China, and this belief is confirmed by history and observation.

Inheritance.—There can be but little doubt as to the question of inheritance of leprosy. Its decided influence on the disease is maintained by nearly all writers on the subject. Hereditary influence is universally accepted in China, and intermarriage of lepers is there forbidden. On the other hand, it is not safe to accept the theory of inheritance as the only mode of propagation. The history of the disease in the Sandwich Islands may again be adduced in opposition to an exclusive theory of inheritance, since scarcely a single generation has elapsed from the time of its appearance in the Islands. The theory of inheritance must necessarily require a much longer time for its proof. Especially is this true of a disease whose incubative stage is measured not by days or months, but by years.

The relation of Leprosy to Syphilis.—The careful study of medical men has been favorable to the belief that syphilis is a predisposing cause only, and productive of a condition favorable to the reception of leprosy in an individual. A recent report of the Hawaiian Board of Health contains an article by Dr. Fitch of Honolulu asserting that leprosy is a fourth stage of syphilis. The weight of professional opinion, however, is to the contrary.

Contagion.—As to the part played by contagion, Dr. White says, in his excellent article:* “Heredity as the only, or an important factor, is entirely out of the question. It would have required several generations to have accomplished such results. We must look, then, to the customs of the race as exceptionally favorable to inoculation as the only possible explanation,—such as the crowding together of large families in small huts, sharing the same mats and blankets, eating poi with the fingers from the same calabash, drinking of ava from the same vessel, passing the pipe from mouth to mouth, their licentious habits, the absence of all fear or disgust of the disease as a bar to ordinary association, cohabitation or marriage.”

The contagious nature of leprosy, although vehemently denied by a few, has certainly been recognized from the earliest ages. In proof of this view are the rigid Levitical enactments of the ancient Jews; the stringent work of both Church and State, in the four-

*“The question of Contagion in Leprosy.” *Am. Journal of Medical Sciences*, October, 1882.

teenth and fifteenth centuries, to stamp out the disease by isolation, dissolution of marriage ties, and social ostracism; and, in the present day, the forcible segregation of lepers from their homes, their relatives and their friends, by sanitary legislative action. These measures have had a salutary effect wherever they have been introduced and enforced for a long period of time, and doubtless contributed to the general disappearance of the disease in the sixteenth and seventeenth centuries throughout Europe.

†In the Hawaiian Islands the disease is made a subject of legislation by "An Act to prevent the spread of leprosy."

* * * * *

As an evidence of the importance of this branch of their duties, the Hawaiian Board of Health expended for the execution of the Leper Act, and for the support of the Leper Colony, in 1872, the sum of \$31,000, out of a total of \$51,000 for all health expenses. In 1874, \$55,000 for the Leper Colony. In 1880, \$85,000 out of a total of \$174,500. In 1882, \$90,000, out of a total of \$237,500.

Sanitary science has been regarded as new, and in fact, has made the most of its progress within the past twenty-five years; but so far as leprosy is concerned, it has existed for centuries. The necessity of isolation was recognized and rigorously enforced in the patriarchal era, three thousand years since; and wherever the disease has invaded and menaced the public safety of a nation, the same principle has been recognized in the construction of leper-houses, lazarettos, asylums, etc., the enactment of laws requiring isolation, the prohibition of intermarriage, and confiscation of property. The same principle was recognized in the Middle Ages in Europe, and also exists at the present day in a varying degree in all places wherever leprosy has gained a foothold.

A careful consideration of the history of leprosy as now existing in two different countries, Norway and the Hawaiian Islands, may afford additional light upon the subject of contagion. In the former country, in 1856, there were 2,863 known cases of leprosy, of which number 235 were in hospitals, and the remainder living in their homes. In later years a diminution of the whole number to 2,704 in 1866, of which number 795 were in hospitals. In 1876 there were 2,008 cases, and there has been a regular decrease since that date to 1,582 cases in 1880, a total decrease of 45 per cent. in twenty-five

†See Section of Report "Leprosy in Hawaii," page 8.

years. ‡This result has been attributed in a great measure to more careful isolation.

On the other hand, in Hawaii the disease has rapidly increased during the same period. Although it has not been known in the Islands more than forty or fifty years at the most, there are now at least 800 lepers, an enormous number when compared with the small indigenous population of 40,000. This people appear to have been extremely susceptible to the introduction of any infectious disease. Syphilis, leprosy and small-pox have made sad havoc among them. At least 500 died of small-pox in 1881.

The excessive death rate already mentioned threatens the life of this little nation, which must sooner or later be wiped out of existence unless the decimation of the people is arrested.

If it be urged that isolation and other sanitary measures have not succeeded in controlling the spread of leprosy in the Sandwich Islands, it should also be stated that in the earlier years of sanitary control the execution of the law was opposed very generally, especially by concealment and deceit.

Again a great obstacle to the thorough understanding of the contagion of leprosy consists in its indefinite and lengthy period of incubation. The shortest time of development is one year, and it has appeared as late as nineteen years after inoculation.* So long a range is unknown in the case of any other disease. In small-pox, scarlet fever and other diseases, the period of incubation is short, decisive and well defined, and hence the active cause is readily recognized. But when this period is measured by years instead of days, the actual facts and conditions of exposure are apt to be forgotten or denied *in toto*.

As a matter of vital importance to the safety of the Hawaiian nation, a Board of Health was organized as early as 1865;† and in accordance with the provisions of the act already cited, a hospital for temporary detention and examination of lepers was established—

‡See Dr. Vandyke Carters's report, "Leprosy in India," page 82.

*As an instance illustrating the doctrine of contagion, and also of extremely long period of incubation, Dr. Hillebrand narrates a case in Borneo, where a boy of European parentage was accustomed to play with a leprous child of color. The native boy thrust a knife into the anæsthetic part of his body, which act was immediately repeated by the white lad with the same knife. The latter was soon after sent to Holland, where he grew to maturity, and nineteen years later developed the disease, returning to Borneo a confirmed leper.

†Reorganized is more correct, as a Board of Health was established in 1850.

a sort of probationary station to which all suspected lepers were taken and examined, or placed under surveillance until they were determined to be either lepers or non-lepers.

After the establishment of the Kalihi hospital, the next move was the purchase of a portion of the Island of Molokai for a colony whence all those who had been determined to be lepers at the Kalihi hospital should be transferred for a permanent residence.

There had been examined up to 1872, 1,288 persons, of which number 570 were discharged at once, and 145 subsequently; 529 were sent to Molokai. Deducting loss by death and other causes, 385 remained March, 31, 1872.

The number of admissions in the following year appears to have greatly increased, for Dr. Trosseau's report states the number in the settlement as 800, or 2 per cent. of the entire population.

The commitments in 1874--1876 were 297, and the deaths from leprosy 299.

The entire admissions to Molokai in ten years were 1,570, an annual average of 157. The deaths in the same time were 872.

The settlement at Molokai is admirably adapted to isolation, which is naturally afforded by the topographical character of the place. A precipitous wall 2,000 feet in height on the one hand, and the sea on the other, render escape almost impossible.

In some villages among the Islands leprosy appears to be much more prevalent than in others.

* * * * *

Dr. Piffard urges the necessity of a national central lazaretto; the confining therein of all lepers now in the country; and the watching of immigration, and giving each leprous immigrant the option of returning to the country whence he came or of entering the lazaretto. This will have to be done sooner or later, and the sooner the less difficult the undertaking.

Bacillus.—A bacillus peculiar to leprosy has been discovered, and may now be considered as a settled fact, its presence having first been asserted by Hansen as early as 1873, and also identified by other foreign observers, among whom are Koch, Kobner, Neisser, Cornil and Suchard. While its presence has thus been repeatedly demonstrated, its position with relation to the inocubility of leprosy is a matter far more difficult to determine, for the reason that most of the animals commonly employed for the purpose of experiment are too short-lived for use with reference to a disease whose incubative period is of such long or indefinite duration.

Dr. Belfield states: "It is, then, established that a bacillus of specific size and shape is a constant element of the diseased tissues in tubercular leprosy. Yet this fact of association does not, of course, prove that the bacillus causes the morbid process, since it is conceivable that it appears as a sequence rather than a cause of the disease. This latter conception is certainly not entirely satisfactory. It does not plausibly explain why this bacterial variety, and this one only, is found, and always found, in the leprosy nodules, but in no other diseased state."

SAN FRANCISCO, CALIFORNIA.

DR. J. L. MEARES, HEALTH OFFICER OF SAN FRANCISCO BOARD OF HEALTH, 1884.

"The isolation of lepers is so important and its necessity so self-evident, that I scarcely think the subject worthy of discussion.

Hitherto the entire expenses of supporting a lazaretto has fallen upon the people of San Francisco, and will continue to do so, unless the State, as it ought to do, takes in hand this important matter.

We probably have more than 100,000 Mongolians on this coast, and even if the Restriction Act should be efficiently enforced, still you have the fact staring you in the face that leprosy will continue to develop, as heretofore among the people.

Those of us familiar with the execution of our sanitary laws, know the fact that leprosy is not imported into San Francisco, unless a case in its incipency should escape the careful inspection adopted both at Hongkong and the port of San Francisco.

This disease, like consumption, may lie dormant for years, and then develop at any period of life without any apparent exciting cause.

The prejudice of the people against the Chinese has undoubtedly confined this disease almost entirely to that race; but as the Restriction Act will necessarily diminish this population, their labor will be more in demand; and when by their industry and desire to learn,

they acquire a more thorough knowledge of our language and become more assimilated to our manners and customs, will not this prejudice gradually subside? And will it not come to pass, in a few years, in this cosmopolitan city, continually being made more so by immigration from all parts of the world, that marriage between the Chinese and people of other nationalities will become a frequent occurrence? Although this disease may not be contagious, in the ordinary acceptance of that term, we are satisfied that it is communicated by inoculation and by other means not necessary to discuss here."

In the year 1883 action was taken by the Board of Supervisors of the City and County of San Francisco, in answer to the public demand to cause strict search to be made throughout the Chinese quarter and the city, and all cases of persons found affected with leprosy or elephantiasis removed to the lepers' quarters provided. In addition to the United States and State legislation, the following Order was finally passed and approved on August 14th, 1883, the enforcement of which it was supposed would aid in preventing persons from being landed afflicted with leprosy or elephantiasis, or if in the city and county from being secreted or kept in any place other than in the lepers' quarters—the intention of the Board, as shown by previous deportations, being to send all Mongolian cases back to China at the first opportunity.

The order referred to is as follows:

ORDER NO. 1,738.

Prohibiting the Landing from any Vessel of Persons afflicted with Leprosy or Elephantiasis within the Bay of San Francisco, and Providing for the Removal of Persons so afflicted to the Lazaretto,

[Preamble.]

WHEREAS, The public welfare demands that some action be taken to prevent the landing of persons within the city and county afflicted with the disease known as leprosy or elephantiasis, which diseases are, in the judgment of this Board, contagious under certain circumstances and conditions; and

WHEREAS, In view of the dreadful results of said diseases, every means justifiable for the protection and preservation of life should be taken by this Board to prevent the free and unrestricted coming of persons from foreign ports who are so afflicted; therefore

The People of the City and County of San Francisco do ordain as follows:

[No Leper or person afflicted with Elephantiasis to land from any ship or boat.]

SECTION 1. No person afflicted with the diseases known as leprosy or elephantiasis shall, upon any pretext whatsoever, be permitted to land from any vessel or boat upon the shore or within the limits of the City and County of San Francisco.

[Captains, Officers, Owners, Consignees or Agents of Vessels arriving to prevent the landing of Lepers from such Vessels.]

SECTION 2. No captain or other officer in command of any vessel arriving at the port of San Francisco, nor any owner, consignee, agent, or other person having charge of such vessel, shall land or permit to leave said vessel in this port, any person afflicted with the diseases known as leprosy or elephantiasis.

[Captains or other Persons having control of Vessels arriving, or in the Harbor, having Leprosy, etc., on board, to report the same to Quarantine Officer within twenty-four hours of the arrival.]

SECTION 3. All captains or other officers bringing vessels into the harbor of San Francisco, and all masters, owners, or consignees having vessels in the harbor which have on board any cases of leprosy or elephantiasis, shall, within twenty-four hours after the arrival of said vessels, report the same in writing to the Quarantine Officer, or as soon thereafter as they or either of them become aware of the existence of said disease on board of their vessels; the said report to state the name, place of birth, last residence, age and occupation of all such persons so afflicted.

LEPROSY IN JAPAN.

Dr. K. Yamamoto, a surgeon on board His Imperial Japanese Majesty's ship "Rinjio," has written the following letter at the request of one of the physicians of this city.—*Saturday Press*, 1883:

HONOLULU, June 19, 1883.

DEAR SIR: I can not give you any precise answers about the number of lepers in Japan, as I have not any recent reports of it from the sanitary office in Japan; but I think they are at present very few in number, probably one in twenty thousand—the whole population of Japan being about thirty-five millions.

I have not seen even a single case of leprosy among Japanese sailors since I commenced to study and practice my profession in the naval department of Japan.

In my country, leprosy is considered as an *incurable and highly inheritable* disease (same as you thought, probably), so those who have leprosy, or its tendency, among their families or relatives, are *strongly refused to marry* with other healthy families.

In Japan the leprosy *is not confounded* with any other disease.

In Japan there is no special hospital supplied by government for lepers, but there is one private leper hospital in Tokio. There is no special place to isolate the lepers, as Molokai in this country, but the lepers are confined to their own homes, and are cut off from any social intercourse with others, being strongly refused by all society.

I am sir, yours faithfully,

K. YAMAMOTO, H. I. J. S. "Rinjio."

LEPROSY IN THE SANDWICH ISLANDS.

FROM DR. JOHN S. MCGREW TO GENERAL JAMES M. COMBY. MEDICAL
RECORD, N. Y., 1881.

HONOLULU, September 26, 1878.

To His Excellency GENERAL JAMES M. COMBY,

United States Minister Resident.

DEAR SIR: In answering the letter handed to me by you from Dr. McBride of San Francisco, I am compelled to be very brief.

The life of a physician here cannot be said to be a sinecure. If I had the ability I have not the time to devote to the subject to make it interesting, I fear, to your correspondent.

The first question, "When leprosy first made its appearance in the Sandwich Islands," is rather a hard one to answer, as the "oldest inhabitant," who is generally as unreliable as other people, is not satisfied as to the date. From the very best information that has been obtained, it has always existed among the natives of the Islands. The most intelligent natives say that their earliest traditions give an account of this disease; that it was not introduced by the Chinese, as some people want to have it.

Second.—"Are all cases of leprosy excluded from intercourse with society?" Very generally. From political and other influences with officials of the Government, many are permitted to go at large without being questioned—really dangerous cases of leprosy.

Third.—"Do foreigners (other than Chinese) have leprosy in the Islands?" I am credibly informed that there never was a Chinaman landed here with leprosy from China. What few Chinamen have the disease, have contracted it since their arrival here, from association and cohabitation with leprous natives. The Leper Hospital contains several English, German and American lepers; quite as many of either of these nationalities as Chinese.

Fourth.—"Do physicians on the Islands consider leprosy contagious or infectious?" Most of our physicians, I might say all,

have every reason to believe it to be both contagious and infectious.

Fifth.—"Is it a fact that a certain Island is set apart for the care of lepers?" A portion of the Island of Molokai was set apart by an Act of the Legislature in 1866, for this class of unfortunates.

. This was considered a necessity, and of the greatest importance to the public health. They are well cared for at the settlement; they have food, clothing and medicine furnished at great expense by the Government, and are more comfortably situated than they could possibly be at their own homes. Still, the mortality is very great at the settlement. It has been in existence about thirteen years; there have been, in all, about 1,850 patients admitted; the number of deaths for the same period is 1,140; leaving over 600 still there.

Hoping, my dear sir, that the questions of Dr. McBride are answered, I am, very truly,

JOHN S. MCGREW.

THE QUESTION OF CONTAGION IN LEPROSY.

DR. WHITE IN AMERICAN JOURNAL OF THE MEDICAL SCIENCES,
OCTOBER, 1882.

In the earliest times and during the medieval ages leprosy was considered and treated as a contagious disease. But when, by the practice of seclusion, rigidly enforced during many centuries, the disease had nearly died out in Europe, men became ready to accept nearly every positive doctrine concerning its etiology put forth by individual observers or scientific bodies. Thus it has happened that during the present century the opinion has been almost universally adopted by the medical profession that leprosy is not contagious, and that it is endemic mostly because it is hereditary. There have not been wanting, however, observers who have stoutly combatted this exclusive doctrine, and who claim that the facts which point to the contagious character of the disease have been neglected or mis-

interpreted. The many other causes which have been assigned are so diverse and contradictory that they call for no consideration. The theories of heredity and contagion, however, are not incompatible, they support each other. We have an illustration of such an etiological relation in syphilis. The important point to be determined is the proof of the latter, not the disproof of the former. Fortunately for the solution of the question we have in the recent introduction of leprosy into an insular nation (Hawaii) and in several freshly developed foci of the disease upon our own continent (New Brunswick, Cape Breton, North Western States, South Carolina, Louisiana, California and Oregon), that virgin field for observation so essential for the proper study of this subject. The lessons drawn from the data thus supplied seem to be confirmed by the teachings of history—and those lessons, or deductions, appear to justify the following conclusions:

Leprosy has spread under recent observation, when introduced into a previously unaffected stock, in so rapid and general a way as to prove that it may diffuse itself universally through a nation, independently of the action of hereditary tendencies. There is no evidence to support the assumption that this wide and quick extension of the disease has been caused or aided by any peculiarity of soil, climate, diet, or other telluric agency in Hawaii. The history of the affection on the other hand, leads to the strongest conviction (scientific proof is well nigh out of the question) that it is communicated directly from person to person, while the peculiar customs offer a satisfactory explanation of its unparalleled spread. The history of the little centre of disease in Louisiana, watched fortunately from its very beginning, leads to the same conclusion that it affects persons not under any law of heredity, but through the intimacy of personal relationship, the customs and morals determining largely the rapidity and universality of its spread. So too, syphilis abstracted from its venereal relationships, could exist as a disease, and does communicate itself in no inconsiderable measure in various other ways. It is only through the assistance of the loose sexual customs or certain grades of the population everywhere that it has become such a world-wide pestilence. Take away from it its characteristic initial lesion, and give it a greatly prolonged incubative stage, and the difficulty of determining the circumstances of inoculation would be as great as in the disease we are considering.

It is probable that leprosy may like syphilis, be communicated

under all circumstances by which some of the fluids and other products of the infected foci of a diseased person come in contact with abraded or excoriated, possibly with the uninjured surface of a healthy person. It would be necessary that the diseased products should be at the surface of the skin or mucous membrane, and this would generally be accompanied during the process of softening by which the impermeable layers were removed. Thus the nodular form in its ulcerative stage would necessarily be the most dangerous phase of disease, whereas the anæsthetic form might exist for years with little danger of communicating itself to its surroundings. In this sense we may conclude that leprosy is contagious, and in these ways, probably, the disease mostly spreads in a family, a community, a nation. Hereditary transmission need not be excluded as a direct cause in individual cases, although as to how largely the disease originates in this way, and how remotely such influences may extend, our exact knowledge is very deficient.

But if contagious, what is the contagious element in the disease? A constitutional virus peculiar to it, or a foreign organism, an entophyte, which is the sole cause of the local tissue changes, and indirectly of the subsequent systemic changes? The latter theory offers, apparently the most satisfactory explanation of the peculiar features of the affection, while of the actual existence of the so-called *bacillus lepræ* in the various tissues of the disease there can be no doubt and but little as to its nature. *A priori*, there is no reason why the bacterium found may not satisfactorily explain all the local and general pathological process characteristic of the disease, and it has been found in connection with cases from so many parts of the world, and by so many reliable and experienced observers, and has under all circumstances, presented so uniformly identical appearances, that the probability of such specific relationship grows stronger and stronger. The results of inoculation are as yet negative.

If, then, we are prepared to admit the contagious nature of leprosy, what measures should be taken for the exclusion from, and repression within the country? We have at present an unknown number of lepers in the United States, let us say fifty or a hundred; three undoubted centres of contagion, affecting three entirely distinct nationalities, in different climates, and under quite diverse methods of living. It is evident that the disease may make more rapid advance in one part than in another. Any circumstances, for

instance, which tends to soften or abrade nodules, as a hot climate possibly, would of course greatly increase the danger of infection, so that the necessity of interference by compulsory means might be more urgent in the former than in the latter. It is evident, however, that such measures should be undertaken by the national government, and that they should be made applicable to all parts of the country alike. These measures should be the establishment of graded hospitals in possibly insular localities in various parts of the country, to which all access should be prevented, except under restrictions determined by professional rules; the enactment of laws which should make residence compulsory and perpetual, and the concealment of the disease punishable by severe penalties.

These rules should apply to so-called sporadic as well as to endemic and imported cases, but the latter should be given the option of returning to their native land. The immigration of lepers should be prohibited and arrested at ports of arrival by inspection so far as possible, as other contagious diseases now are by quarantine regulations. By the establishment of such national measures, immigration from leprous countries would largely cease, lepers would no longer change their residence within the country to escape the action of local laws against their liberty; marriage with them would become abhorrent when the people had thus become aware of its dangers, and after a generation has passed the disease should be virtually eradicated.

Lepers belong to the dangerous classes of the community which require perpetual confinement, and the sooner this remedy is applied the less seeming cruelty will attach to it.

*THE BACILLUS OF LEPROSY.**

WM. T. BELFIELD, M. D., JOURNAL OF CUTANEOUS AND VENEREAL
DISEASES, N. Y. JULY, 1883.

Fourteen years ago, Hansen announced the discovery of bacteria in certain cutaneous nodules removed from patients afflicted with tubercular leprosy. His demonstrations were not, however, entirely satisfactory; for he offered no other proof of the bacterial nature of the bodies in question than their general appearance, size and shape; and the methods which he employed, though the best then devised, failed to give a satisfactory picture. At this time, indeed, (1869) but little attention had been bestowed by pathologists upon the possible pathogenetic relations of bacteria, and had Hansen furnished even an unequivocal demonstration of his assertion, it is scarcely probable that the incident would have attracted much attention.

Within the next decade, however, the role of bacteria in disease became a question of absorbing interest, an object of most extensive and assiduous investigation. Among the fruits of this study were the introduction of accurate and trustworthy methods for the detection and recognition of bacteria—for distinguishing these minute organisms from cell-débris, crystals, organic granules, and other objects of similar appearance. These methods—due chiefly to the ingenuity and industry of Weigert and of Koch, consist, as is well known, in the use of the aniline colors for staining, of the Abbé illuminator, and of special methods for the cultivation of bacteria. In 1878, Neisser, then a private docent in Leipzig, now professor of dermatology in Breslau, having thoroughly familiarized himself with these methods, spent some months in Spain for the express purpose of studying the pathology and history of leprosy.† He reported as the result of these investigations, the presence of a bacillus of specific size and shape in every leprous patient, yes in

*Vide Report of Dr. Edward Arning. Appendix I, page xxxvii. Vandyke Carter, "Leprosy in India," page 100.

† Virch, Arch, Bd. 84.

every leprous tissue examined; not only in the cutaneous nodules, but also in the neoplasms of the mucous membranes, mouth, pharynx, and larynx; in the liver, spleen, lymph-glands, nerves, cartilage, and testicle. He was unable to detect the organism in the blood.

Examinations by other observers, prominent among whom may be mentioned Eklund and Kobner, have unanimously confirmed these assertions of Neisser, and have demonstrated the accuracy of the original observations of Hansen. Although leprous tissue is comparatively scarce material, and opportunities for observation therefore somewhat limited, yet there has been such perfect unanimity of results among all observers as to justify generalization. For no one who has sought *intelligently*—i. e., has properly used the aniline colors, etc.,—has failed to find the bacilli in tissues properly preserved and not too old.‡

* * * * *

The bacteria are found usually within the characteristic large cells which constitute the mass of the leprous neoplasm; sometimes two or three bacilli may be seen in one of these cells. Occasionally a few stragglers are observed lying in the intercellular spaces also. The individual rods are 1-5000 to 1-6500 inch in length, often somewhat thicker in the middle than at the extremities, exhibiting therefore a spindle shape. Like other bacteria, they are characterized by their affinity for certain [(basic) aniline colors—blue, red, and violet especially. In sections of recent tissues the bacilli can be stained with the ordinary two per cent. aqueous solution of the aniline colors; if the tissue has been long exposed to alcohol, the sections should be first treated with a ten per cent. solution of caustic potash, after which they may be stained.¶

The writer's personal knowledge of these bacilli is limited to two cases. A cutaneous nodule was removed *intra vitam* from a private patient by Prof. v. Frisch, of Vienna, and placed at once in absolute alcohol. Sections made a few days later and stained with aniline showed the bacilli in and among the large cells which constituted the mass of the nodule. During a recent visit the writer

‡ After soaking in alcohol for some years or even months, the bacteria often fail to respond to the staining agent, and may be therefore readily overlooked.

¶ For details see Appendix B. to the author's "Cartwright Lectures," W. T. Keener, Chicago, 1883.

had the pleasure of exhibiting one of the sections to numerous gentlemen in New York and Philadelphia, including several members of the New York Dermatological Society.

The second case was a patient in New York, from whom a piece of skin was excised and presented to me by Dr. H. G. Piffard; sections treated with aniline gave essentially the same appearance as in the first case, except that the bacilli were perhaps less numerous.

But little is known as to the natural history of this fungus. Neisser made cultures from lepra-nodules on blood serum and beef extract; he says that the rods grew into threads; that in these threads there subsequently appeared round glistening bodies which he regards as spores. Yet further observation on this point is needed.

It is then established that a bacterium—a bacillus—of specific size and shape is a constant element of the diseased tissues in tubercular leprosy; yet this fact of association does not of course prove that the bacillus *causes* the morbid process; since it is conceivable that it appears as a sequence rather than as a cause of this disease. This latter conception is certainly not entirely satisfactory; it does not plausibly explain why this bacterial variety, and this one only, is found and *always* found in the leprosy nodules—but in no other diseased state. We attribute trichinosis to the trichina spiralis, though we have no other proof of a causal relation than the mere presence of the worm; we ascribe chyluria and lymph-scrotum to the filaria sanguinis hominis, although we know only that this worm is sometimes present in these morbid conditions. Yet the same men who accredit these two worms with morbid influence merely because of their association with diseased states, reject the idea that the bacillus of leprosy is anything more than the *result* of a previously established morbid process.

Yet we are justified in declining to admit the causal relation of the bacillus from mere analogy, if direct demonstration be possible; and in the case of at least one other bacterium such demonstration has been actually furnished. The bacillus anthracis, as is well known, has been cultivated outside of the body on prepared media; has been separated by successive cultures from all ancient tissues; has been in short isolated. And it is an equally familiar fact that these bacilli thus isolated and then introduced into the tissues of a healthy animal, induce a classical anthrax. Until an equivalent demonstration shall be furnished for the bacillus lepræ the proof of

its causal relation to leprosy may be regarded as incomplete. Yet it is evident that the matter cannot be so easily decided for leprosy as for anthrax, since the former disease is peculiar to the human subject—a subject not usually available for experimental purposes of this nature; it seems indeed impossible to furnish the final link in the chain of evidence in leprosy.

Neisser has, it is true, inoculated animals—dogs and rabbits—with the isolated bacilli *lepræ*, and attests that nodules similar to those of leprosy in the human subject were produced at the site of inoculation. Yet one nodule does not make a leprosy, nor is there in fact satisfactory evidence that Neisser's nodules were of other than simple inflammatory origin.

Such then is the status of the question to-day; the association of a specific bacillus with the morbid changes of tubercular leprosy is established and admitted; while the relation of the parasite to the morbid process is not as yet established by direct demonstration.

*The bacillus has not as yet been detected in the so-called anæsthetic form of leprosy.

REPORT OF THE ROYAL COLLEGE OF PHYSICIANS.

IS LEPROSY CONTAGIOUS? AYE.

GRENADA.—I have seen a few persons amongst those affected where contagion appeared evident.

I consider that contagion will take place when ulcerations exist with copious discharge, and this can only occur in the first or tuberculous leprosy.

I do not think the disease in its incipient stage transmissible by sexual intercourse.—DR. AQUART.

GU'IANA.—I have met with only two cases in which after minute enquiry, I believe the disease to have been communicated by direct contact. My own opinion is in favor of the contagiousness of

*Vide Dr. Arning's Report, page xxxix.

leprosy, and that it may be propagated by the matter of ulcerated tubercles being applied to any raw surface; but I admit that I have met with cases which would seem to preclude the idea that the disease can be considered contagious in the ordinary sense of the term.

I have known instances where black women have cohabited for years with their husbands while laboring under confirmed and ulcerative leprosy, and have children by them, without manifesting the slightest trace of the disease.—**DR. MANGUET.**

I am clearly of opinion that it is contagious in every stage and form, and especially so after ulceration. I have seen many instances which could only be referred to contagion; the convictions of the parties, and the most rigorous examinations of the history of the cases giving no clue whatever to the pre-existence of any family taint. It is notorious in respect of a white family of distinction in this colony, that, having disregarded the warnings of their medical advisers of the danger of permitting the young members to play in company with a negro boy who exhibited the symptoms of the disease, they one and all became infected, and the majority of them fell victims to the fatal indiscretion.

The liability to the disease in this way (sexual intercourse) is undoubted.—**DR. POLLARD.**

From what I have seen and heard in Surinam, Dutch Guiana, where more attention is paid to the disease than in British Guiana, I believe it to be contagious. I have known an officer of high rank there contracting it from cohabiting with a woman whose family were affected with it. In Dutch Guiana, people are afraid of shaking hands with any persons who are suspected of the disease, and even of setting on the chair which they have occupied, or of using the same privies.—**DR. VAN HOLST.**

CORFU.—Two instances I have met substantiate the opinion that it is contagious after a lapse of time. In both, the wife became affected some years after the husband had been attacked.—**PRORO MEDICO.**

MAURITIUS.—I have met with two cases where the disease seemed to be transmissible; in the one instance from the husband to the wife, and in the other from a man to a child of his wife from a former husband.—**DR. REGNAUD.**

SUMBULPOOR.—On the subject of contagion there appears to be some room for doubt. I have never known or heard of a case in

which simple contact on one occasion has produced the disease, but by prolonged liability to contact with, or close proximity to diseased persons, there is reason to believe that the disease has been reproduced.—DR. JACKSON.

MOZUFFERPORE.—I know of many cases in which there was a clear proof of the contagious nature of the disease. I believe leprosy is also contagious when the ulcerative stage has commenced, and it appears as if the disease took a very long time to affect the system. It is not a matter of days, or even months but of years.

There can be no doubt of it (transmissibility by sexual intercourse).—DR. MACNAMARA.

CAWNPORE.—The native doctors say it is contagious in the suppurative stage.—DR. JONES.

BUDAON.—I have met with instances in which the disease proved to be contagious, after living in close proximity to the diseased persons for a long period of time, say one or two years. The malady was in full vigor, and there were ulcerations with a discharge.—DR. HARRIS.

SINGAPORE.—I have met with three cases in which I can with certainty state the disease was contracted by continued and direct contagion.—MR. ROSE.

LABUAN.—I have not met with a case I could satisfy myself had arisen from contagion; but it is the universal belief among the people, whether Chinese, Malay, or Dyak, that it is contagious, and they all alike separate the lepers, and avoid all contact with them.—DR. McDOUGALL.

IS LEPROSY NON-CONTAGIOUS?

NEW BRUNSWICK.—I am thoroughly convinced that the disease, in Tracadie, is not contagious, and that it is not transmissible by sexual intercourse.—DR. BAYARD.

I have never met with an instance of leprosy being communicated to a healthy person by contagion.—DR. NICHOLSON.

Several lepers have cohabited with their wives for years, and no infection was communicated to them.—DR. BENSON.

JAMAICA.—I am certain that it is in no way contagious, and that it is not transmissible by sexual intercourse. The evidence

against the contagion of leprosy, in all its forms, is irrefragable.—
DR. FIDDES.

BARBADOES.—I have not met with any cases of contagion. None of those in attendance, during the last nine years, upon the inmates of the lazaretto have contracted the disease; and I, after receiving a wound from a knife, moistened with the fluids of an inmate, have escaped, although the wound was followed by great constitutional irritation and loss of the finger. From what I have heard I do not believe it communicable by sexual intercourse.—
D. BROWNE.

TRINIDAD.—I have never met with a single instance of it appearing to be so.

The disease has not been transmissible by sexual intercourse in many cases which have been under my care, and which most decidedly confirm my opinion that it is not contagious.—DR. SATURNIN.

CAPE OF GOOD HOPE.—I have not seen a single case where it was communicated by contagion. I have known lepers cohabiting with females who remained exempt.—DR. EBDEN.

JERUSALEM.—I have never heard of such instances.—CONSUL FINN.

DAMASCUS.—It is not contagious and not transmissible by sexual intercourse.

RHODES.—It is entirely exempt from contagion, or transmissible by sexual intercourse.

MYTELENE.—It is demonstrably not contagious.

CRETE.—There are 127 persons who have all lived together healthy among lepers for many years.—DR. BRUNELLI.

CORFU.—I have never been able to recognize the contagiousness of leprosy. Women have often lived with leprous husbands without contracting the disease.—DR. TYGALDOS.

TABREEZ.—I have met with no case of direct contagion.—DR. CORMICK.

SHANGHAI.—I have never met with an instance of the disease appearing to be contagious.—DR. HENDERSON.

VICTORIA.—No instance of apparent contagion has been met with in this country.

CEYLON.—I have no reason to consider it contagious, or transmissible by sexual intercourse.—DR. DAVY.

I have not met with a single case of contagious communication of the disease, although popular belief in this country is strongly in favor of its communicability.—T. A. P.

I have not known a single instance in which a wife whose husband was a leper, was affected by this disease, whereas numerous instances have come under my observation in which the offspring of a diseased person has been affected.—T. G.

BOMBAY PRESIDENCY.—None of the observers appeared to have obtained conclusive proof of leprosy being contagious, or transmissible by sexual intercourse.

MADRAS.—Leprosy does not appear to be contagious.

BENGAL.—It is not a contagious disease in the ordinary sense of the term, nor does it seem communicable by sexual intercourse.—DR. JACKSON.

CALCUTTA.—Never. It is transmissible by sexual intercourse.

ARRAH.—As far as I can ascertain it is not known to be contagious or infectious.—DR. HUTCHINSON.

CAWNPORE.—I have met with none.

SEROLIE, JUDPOORE, ULWUR, JEYPORE, HAROWTEE, NAGPORE, and MOULMEIN, also negative.

KYOUK PHYOO.—I have never met with an instance. I do not believe it is transmissible by sexual intercourse.—DR. THOMAS.

AKYAB.—I have seen nothing to induce me to believe that leprosy is contagious, and I do not believe that it is ever communicated in this way, nor ever by sexual intercourse.

IS LEPROSY HEREDITARY?

NEW BRUNSWICK.—It is certainly hereditary. Some members of a family may be attacked and others remain exempt. DR. BAYARD.

JAMAICA.—It is frequently hereditary—particularly in the third generation.—DR. FIDDES.

DOMINICA.—My belief is that leprosy is hereditary.—DR. MURRAY.

BARBADOES.—It does appear to be hereditary, but I cannot say often so.—DR. BROWNE.

There can be no doubt of its being hereditary.—DR. STEVENSON.

GUIANA.—It is undoubtedly hereditary. The disease often overleaps an entire generation to re-appear in the next; the immunity may commence in the immediate family of the leper himself. It is possible that many cases presumed to be of hereditary origin are instances either of extraneous contamination, or of the propagation of the disease from one member of a particular family to the others.—DR. POLLARD.

CAPE OF GOOD HOPE.—Most decidedly hereditary.—DR. EBDEN.

SIERRA LEONE.—Invariably, as far as I can ascertain. It generally skips a generation.—MR. BRADSHAW.

DAMASCUS.—Few lepers have children; but when they have, some of the children are diseased and others are not.

SAMOS.—Yes. Certainly.

CONSTANTINOPLE.—Yes. Certainly, yet it often appears spontaneously.

CANTON.—Leprosy is undoubtedly a hereditary disease. It is said to become mild in the third generation and run itself out in the fourth.—DR. HOBSON.

MAURITIUS.—Unequivocally so.—DR. REGNAUD.

CEYLON.—It is often hereditary.—T. A. P.

BOMBAY.—Opinions are divided as to whether it is often hereditary, Dr. Carter thinking it is.

MADRAS.—By statistics, inheritance does not constitute a strong predisposition to the disease.—DAY, PORTEOUS, SHORTT, SHAW.

BENGAL.—Yes, the disease does often appear to be hereditary.—DURANT.

FUNEEDPORE.—Notwithstanding its undoubted power of transmission from parent to offspring, it is also a noted fact that it is often capable of spontaneous origin, and that these idiopathic cases are just as numerous, if not more so, especially in the tropics, as those which can alone be traced to parental influence.

ARRAIL.—Hereditariness is the predisposing, and bad food the exciting cause of the disease; the fact of its appearing among the rich and wealthy shows that it must be hereditary.

BENARES.—All but Dr. Dale consider the disease to be hereditary; the natives believe it to be so.—DR. DUNBAR.

SEIHARUMPORE.—The belief in its hereditary transmission was

so deeply grounded in the minds of the Punjaubees generally, that they were in the habit of burying alive, not only the leper himself, but also his relations and friends, lest in multiplying their kind, the disease would be communicated to distant generations.

LAHORE.—It is often hereditary but not always so.—BOSE.

NIMAR.—The disease in several cases would seem to be hereditary. Cases pass over a generation frequently.—HUNTER.

NAGPORE.—Out of 228 cases it was hereditary in 40.

AKYAB.—That leprosy is hereditary is a belief universal in India.—NISBET.

IS LEPROSY CONNECTED WITH SYPHILIS?

NEW BRUNSWICK.—It is a disease by itself. Syphilis and yaws are unknown in the district where it prevails.—NICHOLSON.

JAMAICA.—Disease by itself. I have little doubt yaws and leprosy may run their course together as also leprosy and syphilis.—BOWERBANK.

DOMINICA.—No. *Imray*. The yaws is a disease different in its nature.

ST. VINCENT.—I think it is connected with scrofula but not with any other disease. I regard leprosy as a form of scrofulous disease.—CHECKLEY.

BARBADOES.—It is a disease *sui generis*.—GODING.

I will not say that syphilis can produce true leprosy; but that it can produce a disease so closely resembling it as to deceive the most careful observer, I fully believe. It is most common in the offspring of syphilitic patients.—STEVENSON.

TOBAGO.—I look upon leprosy, syphilis, and yaws as cognate.—PURSER.

TRINIDAD.—I have not, but syphilis and yaws may co-exist with it.

GUIANA.—Leprosy is a disease *sui generis*, independent of any other disease.—REED.

Specifically from any other disease.—POLLARD.

I firmly believe leprosy to be connected with syphilis, yea, even to be an offspring of it; imperfectly cured syphilis in parents causes the disease to break out in the progeny of the second, third or fourth generation.—VAN HOLST.

DAMASCUS.—Leprosy is a separate and independent disease, known in Arabia for many centuries, and mentioned in the Koran by Mohammed under the name of “Jezam;” whereas syphilis was not known here until the French invasion under Napoleon, when his soldiers brought it hither, whence it is called Hal Franji, or the Frank evil.

CRETE.—Although there are certain symptoms in the first stage of the disease resembling those of syphilis, it is not connected in any way either with that or any malady.

TABREEZ.—No. Syphilis is rare in the villages of Persia.

MAURITIUS.—I have not. In two cases the disease declared itself at the same time with a syphilitic eruption. After the disappearance of the latter, the leprosy continued.

CEYLON.—Scrofula and syphilis would lead to leprosy under favorable conditions, but that leprosy is a constitutional form of syphilis, I do not think.—H. D.

Leprosy is often dependent or connected either directly or remotely with syphilitic taint.—T. A. P.

The majority of cases under my observation were connected with syphilis.—T. S.

BOMBAY PRESIDENCY.—Opinion is decidedly against the connection of leprosy with syphilis, yaws or any other disease.

MADRAS.—Syphilis is extremely common among the natives of India, and all the reporters who have come in contact with leprosy mentioned syphilis as no uncommon complication. In none of these reports is connection traced between leprosy and syphilis.

BENGAL.—I have no reason to believe that leprosy is in any degree dependent upon syphilis or any other disease.

MOORSLEDABAD.—Leprosy is very often connected with, if not dependent on syphilis and the abuse of mercury in native practice.—FLEMING.

PUBNA.—In connection with syphilis but in some cases with scrofula.—PARKER.

SERAMPORE.—In cases of secondary syphilis in which mercury has been administered over and over again the disease has not unfrequently degenerated into leprosy.

BHANGULPORE.—I have very good reasons to know that leprosy is dependent on syphilis, for I have known several cases to have been preceded by syphilis.—CREWE.

ALMORAH.—The natives themselves believe leprosy to depend very often on a syphilitic taint, but I am disposed to think this altogether a mistake. No doubt with a predisposition to leprosy already existing, if a person's constitution becomes tainted with syphilis, this, like any other cause, may develop the disease, but I think the morbid cause of each is quite distinct.—**MERTON.**

HILL STATES.—No. Yet syphilis is extremely common.—**GURDEN.**

BHUTTEEANA.—Yes, more than half the cases were sufferers from syphilis in one form or another.

LAHORE.—Is often, not always, dependent on syphilis, which may be considered as one of its most powerful predisposing causes.—**BOSE.**

JODHPORE.—I believe a person afflicted with secondary syphilis will be more likely to become the subject of leprosy, in consequence of the cachexia the first named disease induces. I believe both diseases may exist and become as it were blended together. I do not think there is any such disease as syphilitic leprosy, that is leprosy arising from syphilis as an exciting cause.—**MOORE.**

GWALIOR.—It is a distinct disease. but it may have some connection with scrofula.—**SUTHERLAND.**

NIPAL.—I do not believe that syphilis, except in cases where there is a decided constitutional or inherited tendency to leprosy, has anything to do with its development, although syphilitic eruptions often assume a decidedly leprous character.—**OLDFIELD.**

AKYAB.—Probably mercurial and syphilitic poisons may induce a cachectic condition of system highly favorable to develop leprosy where the hereditary taint exists.—**NISBET.**

EXTRACTS FROM NOTES ON "A FEW CASES OF LEPROSY."

BY J. H. BEMISS, M. D., LAHAINA, MAUI, H. I.

NEW ORLEANS MEDICAL AND SURGICAL JOURNAL. APRIL, 1880.

* * * Statistics as to the time and manner of introduction of leprosy into the Hawaiian Islands are wanting. The period between 1825 and 1830 is supposed to approximate to the correct time of importation, though the evidence to that effect is very indefinite. Rev. W. P. Alexander who came here in 1833, says the first case he met with personally was that of a native Hawaiian in about 1838, living in a very isolated locality on this island (Maui), but he had heard several years before that a chiefess in Lahaina—also on Maui—was affected with the disease. The first case on the Islands was said to have been that of a Chinaman on Oahu, the island upon which Honolulu is situated.

Of course the manner of introduction is just as uncertain as the time. The means of importing it, however, have been unlimited. During the height of the whale hunting business, that is, during the first half of the present century, these islands were the great resort for the whaling fleets of the Pacific, as many as a hundred sail often being in the harbors of Honolulu, Oahu; or Lahaina, Maui, at one time. These vessels in addition to bringing sailors from all parts of the world, frequently shipped native crews, who in their cruises were brought in contact with all nations along the Pacific, and afterwards returned here to spread such diseases as they might have contracted. But before whalers ever touched at these islands, the natives are said to have occasionally gone from island to island in the Pacific, exchanging their diseases as well as their commodities, which latter, however, were probably very limited. It may be then that the disease was present here in a dormant state long before it became generally known—at least to foreigners. The old disease, "mai alii"—"chief's disease"—is generally supposed to have been

Elephantiasis Arabum, or else the result of high living, in which the chiefs indulged. Some, however, have thought it not too much to suppose some of the cases to have been leprosy.

The natives call leprosy "mai pake," "Chinese disease," the tradition among them being that the "heathen Chinese" brought it with them. But the first lot of Chinamen did not come here until quite a number of years after leprosy became known, and this charge seems the more unwarrantable when we consider that of the whole population at the leper asylum there are not over six Chinamen.

After its introduction it seems to have spread quite slowly until the latter part of the ten years, 1850—1860. It then became so plentiful that the government took alarm and began to institute measures, looking toward the prevention of its spread; one of its acts being the establishment of the Leper Asylum on Molokai, and the forcible transfer of pronounced cases to that place. The census of 1878 (December 21st), showed the number of lepers at the Asylum Kalawao, at that date to have been 806; since then quite a number have been added, though there are still many at large. There have been admitted to Kalawao certainly not less than 2,000 persons from 1866 to date; of which number upwards of 750 are still alive.

The total native population, excluding all foreigners and those born of foreign parents, is 44,088 (census of 1878), quite a small number to furnish so much leprosy. The large majority of these are full blood natives or half breeds, there being two whites,—one American, the other English, and less than a half dozen Chinamen.

There are present here, the two forms, tubercular and anæsthetic. This division is based upon the predominance of one or the other of the two most important symptoms. In actual observation the disease does not always admit of such strict classification, but generally shows the two forms combined in greater or less pathologic preponderance. It may start as purely tubercular or purely anæsthetic, but does not often preserve a single type throughout its course; in the one case anæsthesia, in the other tubercles making their appearance in due time. As to a third variety, macular, my observation does not warrant my stating any such class. True macule of one sort or another are common enough, but these cases already present one or the other of the two forms generally recognized. I have seen but one case in which I was not easily able to observe tubercles or anæsthesia well marked.

This man had several large, light and slightly raised maculæ upon his body, as the only main symptom of the disease, but these were anæsthetic, and there was a slight enlargement of the alæ nasi due to infiltration, one of the phenomena of incipient tubercular leprosy.*

The tubercular variety is characterized by infiltration and subsequent hypertrophy of the skin, especially where there is much loose tissue, such as the lobes of the ears, alæ nasi and face generally. Later on there is deposited in the skin of the face, hands, arms, etc., cheesy masses of the size of a pea or a little larger. These tubercles are prone to break down and leave deep indolent sores, which heal, however, after a time, but with strangely marked cicatrices. Mucous membranes, just as the external skin, are liable to the above morbid changes. They may become infiltrated and hypertrophied, or tubercles may appear in their substance and undergo ulceration. When such changes occur in the larynx an alteration of the voice is the result. In breaking down, they produce a most offensive fetor of the breath. The same changes occurring in the mucous membrane of the intestines are in a certain proportion of cases the cause of the diarrhœa which is so common, and so often fatal. But in many instances diarrhœa is only one of the many intercurrent affections due to a vitiated state of the system. In cases primarily anæsthetic, I have on several occasions first observed tubercles upon the mucous membrane of the posterior part of the tongue and pharynx, as the only localities where they may be seen at that stage.

The anæsthetic form is marked by all those phenomena which are the result of degenerative changes in the nerves. These are anæsthesia, paralysis, contractions and distortion, especially extreme flexion or extension of the fingers and toes, also ectropion, loss of smell and taste, wasting of muscles, vesicles, sloughing of fingers

* After having prepared this for the mail, I was upon Molokai on professional business, and there saw a case more purely macular than the above. The child a girl ten years old, presented upon her face especially, but also elsewhere upon her body, large black maculæ, slightly raised above the surface and producing a very disastrous effect upon her appearance. She was so young, that it may be she did not understand my questions; at all events, neither by questions or close examination could I obtain any evidence of anæsthesia. Scattered from her left eye brow to her hand were not less than six small tubercles, on her right hand there were about half as many.

and toes, etc. The ulnar and facial nerves are especially frequently affected, but all are liable.

It is with difficulty that any history of a prodromic stage can be obtained from a native. They are by no means observant of such matters, but occasionally one may be found who will complain of a general indisposition extending over a period of several months or even longer.

When anæsthesia plays an important part from the first, the patients very frequently speak of formications, over the entire body sometimes, but especially over the nerves which afterwards become anæsthetic.

* * * * *

It will be noted that syphilis or any syphilitic cachexia were in every case diligently sought for, for there are some on these islands, as well as in India and elsewhere, who hold to an intimate connection between syphilis and leprosy. If there is any such relation as they claim, then it is unnecessary to speculate as to the manner of introduction of leprosy into this Kingdom, for though my experience in foreign lands is confined to these Islands, I am not prepared to read of a country where syphilis is so prevalent, so grounded into the whole native population as here. The problem, then, would be, how long the disease—syphilis—left to itself, would require to become elaborated into leprosy. But I am not willing yet to adopt such an hypothesis, for then should leprosy be more general in the families of those affected, as well as more common in other countries, where there is a certain proportion of families thoroughly imbued with syphilis, and from which they have not been exempt for several generations. Again, anti-syphilitic treatment should give some good results, which is not the case, save when syphilis is added to the disease. Moreover, the symptoms of the two diseases do not coincide in a way to warrant such an opinion.

Vaccination was also inquired into. Alarmed by an invasion of small-pox in 1853, a general vaccination of the whole population was ordered, and physicians being at that time very few on the Islands, non-professionals aided in the work. It is charged by some that, as a natural result of the labors of the heterogeneous force so appointed, not only syphilis but also leprosy was greatly increased. In my last circuit trip in my district, I found very few adults who had never been vaccinated.

This involves the question of inoculability, in my opinion the main, if not the only means of propagation, other than inheritance. That is, like syphilis it depends for its propagation upon the direct introduction of its virus into the blood. The general immunity of those coming in constant contact with lepers points to the absence of any direct contagious quality.

INDEX.

	PAGE
Abbott. Massachusetts Health Report. - - -	205.
Aguirre. Chili. - - -	168.
Agra Leper Asylum. - - -	60.
Ahmedabad Hospital. - - -	55.
Almora Leper Asylum. - - -	58.
American Dermatological Association. - - -	197.
Amritsar Asylum. - - -	63.
Amsterdam. Dr. Van Deventer. - - -	186.
Ancient India, Leprosy in - - -	80.
Asylums. - - -	50-65.
Atréya on Leprosy. - - -	80
Bacillus of Leprosy. Belfield. - - -	223.
Backergunge. Murray, W. F. - - -	35.
Barbadoes. - - -	229.
Barcelona. The Faculty of - - -	194.
Bankoora. Dutt. - - -	20.
" Jail. Bengal. - - -	57-78.
Barrh. Zaheerudeen. - - -	40.
Banerjee. Bengal. - - -	14.
Beehar Cooch. Comins. - - -	41.
Belfield. Bacillus of Leprosy. - - -	223.
Bemis. "Notes on a few cases of leprosy." - - -	235-239.
Bengal. Banerjee. - - -	14.
Bensley, C. E. W. Dumka. - - -	26.
Bensley, E. C. Rajshahye. - - -	28.
Bombay. Darmshala Asylum, - - -	53.
" Jeejeebhoy Hospital. - - -	54.
" Moore. - - -	12.
British India. Report from - - -	9-101.
Brunswick New. Graham. - - -	157.
" " Smith. - - -	154.
" " Taché. - - -	135.
Calcutta. Ghose. - - -	14.
" Leper Asylum. - - -	55.
California. San Francisco, Meares. - - -	214.

	PAGE
Canada. New Brunswick. Graham.	157.
“ “ Smith, A. C.	154.
“ “ Taché.	135.
Canary Islands. Torrens.	158.
Canney. Trichinopoly Leper Hospital.	51.
Carter. H. Vandyke. Notes of cases treated.	72.
“ Norway. (1884).	82.
“ Pathology of Leprosy.	100.
“ Prevention by Segregation.	82-101.
Caspersen. Norway.	191.
Ceylon. Kynsey.	161.
Chatterjee. Ruthigora.	22.
Chili. Thomas.	168.
Chittagong. Murray, R. D.	36.
Chumparum. Civil Surgeon.	84.
Cockburn. Hooghly.	16.
College of Physicians (Eng).	226.
Comins. Cooch Behar.	41.
Contagion. Question of, White.	219.
Contai. Mookerjee.	23.
Cooch Behar. Comins.	41.
Countries. Reports from Foreign	102-218.
Crombie. Dacca.	36.
Cunningham and Lewis, Kumaun.	78.
Cuttack. Stewart.	37.
Dacca. Crombie.	36.
Darmshala Asylum.	53.
Dehra Dún Leper Asylum.	59.
Dermatological Association of America.	197.
Deventer Van J. Netherlands.	186.
Doss. Ghattal.	22.
Dougall's treatment.	75.
Duiagepur. Webber.	34.
Dumka. Civil Surgeon.	26.
Duncan. Julpaiguri.	29.
Dutt. Bankoora.	20.
Egeling. Holland.	176.
Eklund. Sweden.	198.

	PAGE
Farquharson. Iowa.	198.
Farrar. Iowa.	204.
France. Academy of Medicine.	168.
Ghattal. Doss.	22.
Ghose. Calcutta.	14.
“ Rungpur.	32.
Gomez. Mexico.	178.
Goopta. Patna.	39.
Graham. Canada.	157.
Greene. Serampore.	20.
Gronvold. Norway.	202.
Guatemala. Valladores and Yela.	173.
Gupto. Midnapur.	24.
Gurbetta. Sein.	23.
Hawaiian Islands. Bemis.	235-239.
Hill. Monghyr.	40.
Holland. Egeling.	176.
Hongkong. Keswick.	177.
Hooghly. Cockburn.	16.
Hospitals, Asylums, etc. India.	50-65.
Illinois.	198.
India. British. Leprosy in.	9-101.
Iowa.	198.
Japan.	217.
Jeejeebhoy Hospital.	54.
Jessore. Wright.	35.
Jullundur Asylum.	62.
Julpaiguru. Duncan.	29.
Kangra Asylum.	61.
Keswick. Hongkong.	177.
Kumaun. Lewis and Cunningham.	78.
Kurtzhalss. Siam.	193.
Kynsey. Ceylon.	161.
Leprosy in Ancient India. Atréya.	80.
“ in the Sandwich Islands. McGrew.	218.
Lewis. Kumaun.	78.

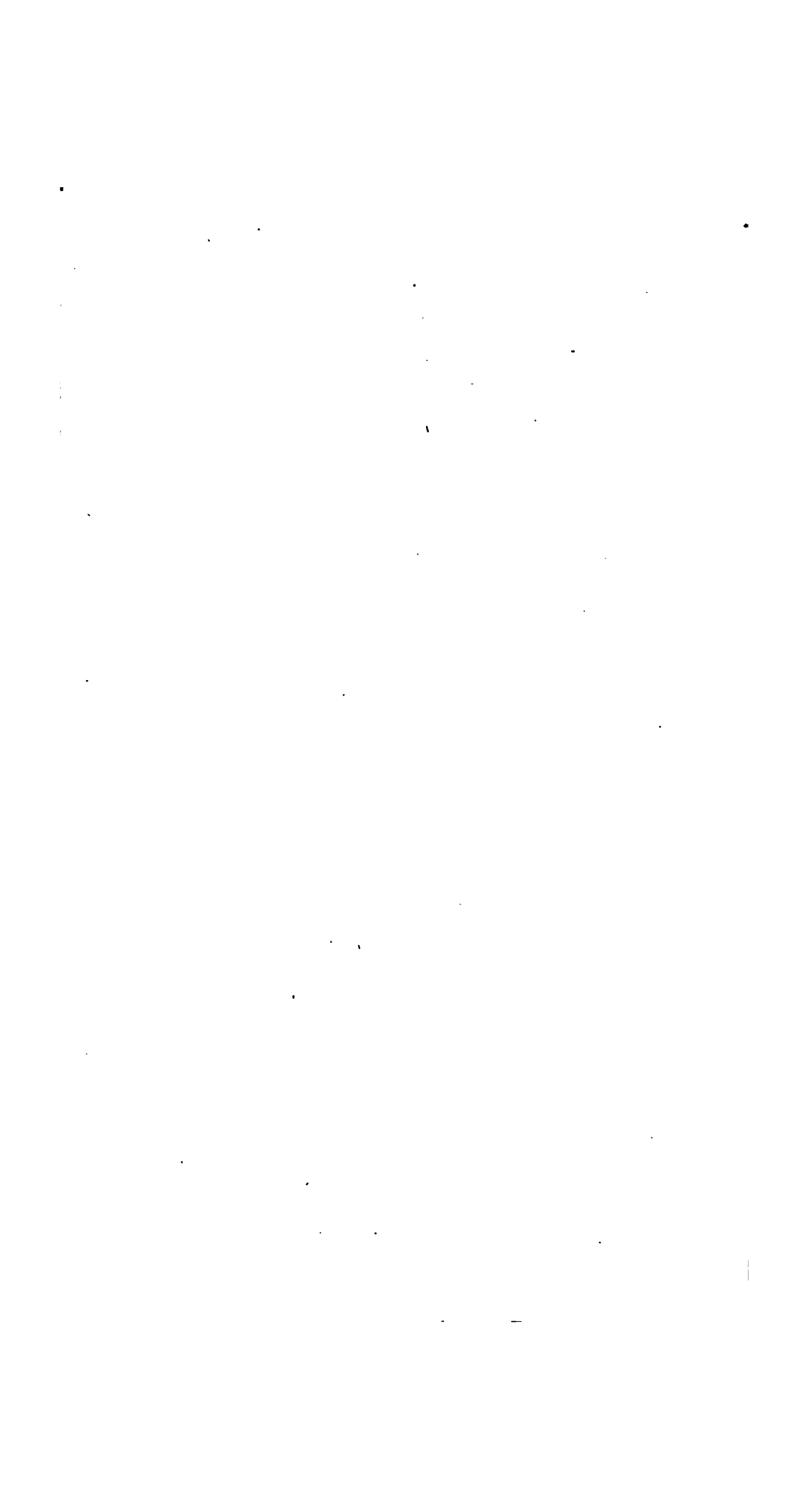
	PAGE
Mackenzie. Secretary Government of India. - -	9.
Madras Leper Hospital. Thompson. - -	50.
Massachusetts Board of Health. - .	205.
Matthew. Midnapur. - - -	21.
Meares. San Francisco. - - -	214.
Mexico. Gomez. - - -	178.
“ Superior Council of Health. - -	181.
Midnapur. Matthew. - - -	21.
“ Gupto. - - -	24.
Minnesota. - - -	198.
Mookerjee. Contai. - - -	23.
Moore. Bombay. - - -	12.
Moorsheadabad. Shircore. - - -	24.
Monghyr. Hill. - - -	40.
Morgan. Palliport Lazaretto. - -	52.
Murray. R. D. Chittagong. - - -	36.
Murray. W. F. Backergunge. - - -	35.
Netherlands. Colonial Minister. - -	188.
“ Egeling. - - -	176.
“ Van Deventer. - - -	186.
Norway. Consul General. - - -	191.
“ H. Vandyke Carter. - - -	82.
Nuddea. Bensley, C. E. W. - - -	27.
Orissa. Roy. - - -	39.
Oudh. Walker. - - -	15.
Palliport Lazaretto. Morgan. - -	52.
Pathology of Leprosy. Vandyke Carter. - -	100.
Patna. Goopta. - - -	39
Peters. Treatment in India. - - -	66.
Physicians. Royal College of (Eng). - -	226.
Picachy. Purneah. - - -	31.
Poona. Sassoon Infirm Asylum. - -	53.
Poor Houses, and Asylums. India. - -	60.
Prevention by Segregation. Carter. - -	82-101.
Purneah. Picachy. - - -	31.
Questions addressed to Foreign Governments. -	6-102-134.

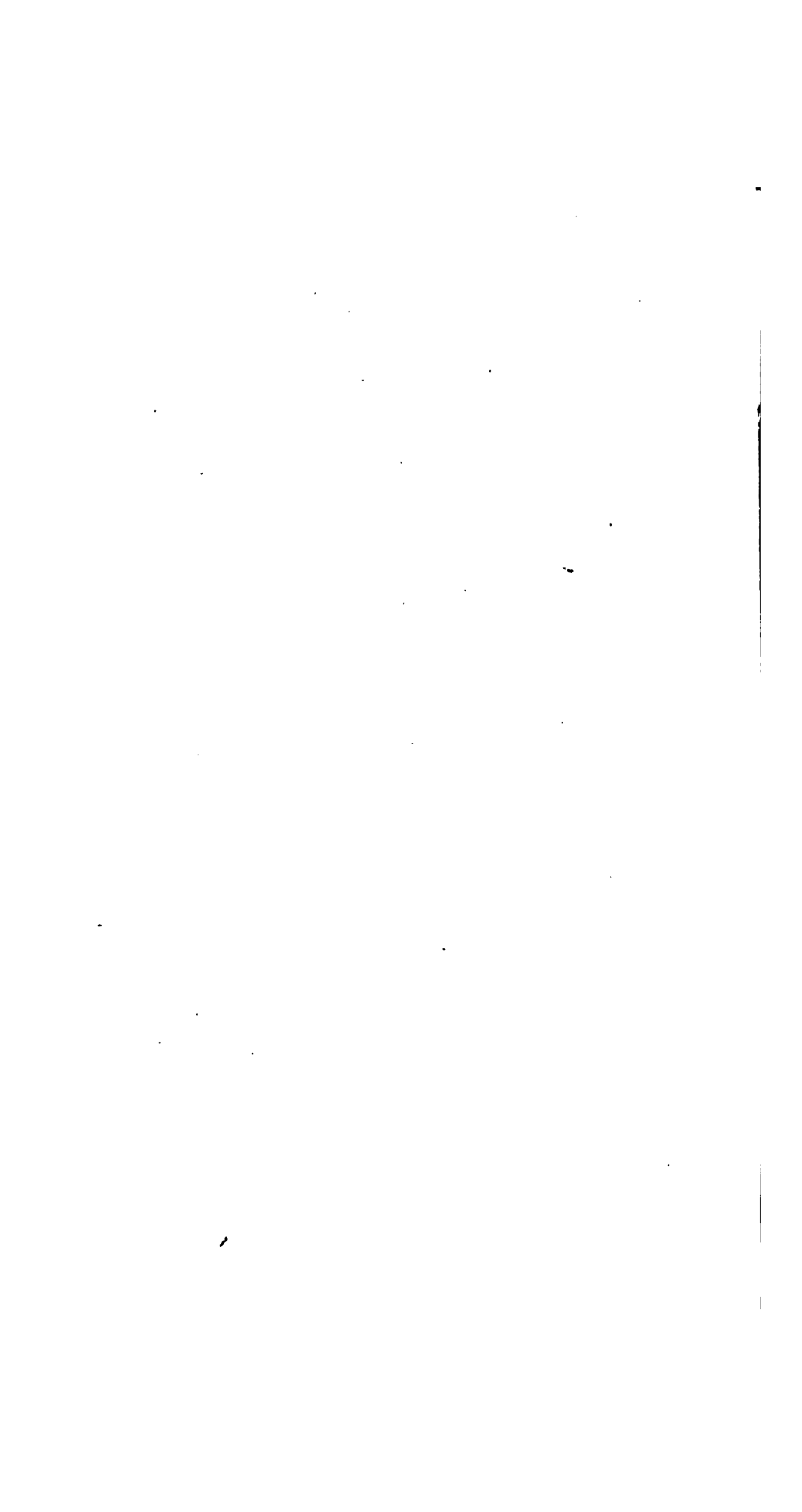
	PAGE
Reports from Agra Leper Asylum. - - -	60.
“ “ Ahmedabad Hospital. - - -	55.
“ “ Almora Leper Asylum. - - -	58.
“ “ American Dermat. Association. -	197.
“ “ Amritsar Asylum. - - -	63.
“ “ Amsterdam. Van Deventer. - -	186.
“ “ Asylums. - - -	50-65.
“ “ Backergunge. - - -	35.
“ “ Barbadoes. - - -	229.
“ “ Barcelona. - - -	194.
“ “ Bankoora. - - -	20.
“ “ Bankoora Jail. - - -	57-78.
“ “ Barrh. - - -	40.
“ “ Beshar Cooch. - - -	41.
“ “ Bengal. - - -	14.
“ “ Bombay. Darmshala Asylum. -	53.
“ “ Bombay Jeejeebhoy Hospital. -	54.
“ “ Bombay. Dr. Moore. - - -	12.
“ “ British India. - - -	9-101.
“ “ New Brunswick. Graham. - -	157.
“ “ New Brunswick. Smith. - -	154.
“ “ New Brunswick. Taché. - -	135.
“ “ Calcutta. Ghose. - - -	14.
“ “ Calcutta Leper Asylum. - -	55.
“ “ San Francisco. - - -	214.
“ “ Canada. - - -	135-157.
“ “ Canary Islands. - - -	158.
“ “ Vandyke Carter. Cases. - -	72.
“ “ Vandyke Carter. Norway (1884). -	82.
“ “ Vandyke Carter. Pathology of Leprosy. -	100.
“ “ Vandyke Carter. Prevention by Segregation. -	82-101.
“ “ Ceylon. - - -	161.
“ “ Chili. - - -	168.
“ “ Chittagong. - - -	36.
“ “ Chumparum. - - -	34.
“ “ College of Physicians, (Eng). -	226.
“ “ Contagion. Dr. White. - -	219.
“ “ Contai. - - -	23.
“ “ Cooch Behar. - - -	41.
“ “ Cuttack. - - -	37.

	PAGE
Reports from Dacca - - - -	36.
“ “ Darmshala Asylum. - - - -	53.
“ “ Dehra Dún Leper Asylum. - - - -	59.
“ “ Dougall's treatment. - - - -	75.
“ “ Duiagepur. - - - -	34.
“ “ Dumka. - - - -	26.
“ “ France. Academy of Medicine. - - - -	168.
“ “ Ghattal. - - - -	22.
“ “ Guatemala. - - - -	173.
“ “ Gurbetta. - - - -	23.
“ “ Holland. - - - -	176.
“ “ Hongkong. - - - -	177.
“ “ Hooghly. - - - -	16.
“ “ Hospitals, Asylums, etc. India. - - - -	50-65.
“ “ Illinois. - - - -	198.
“ “ Iowa. - - - -	198.
“ “ Japan. - - - -	217.
“ “ Jeejeebhoy Hospital. - - - -	54.
“ “ Jessore. - - - -	35.
“ “ Jullundar Asylum. - - - -	62.
“ “ Julpaiguru. - - - -	29.
“ “ Kangra Asylum. - - - -	61.
“ “ Kumaun. - - - -	78.
“ “ Madras Leper Hospital. - - - -	50.
“ “ Massachusetts. - - - -	205.
“ “ Mexico. - - - -	178-181.
“ “ Midnapur. - - - -	21-24.
“ “ Minnesota. - - - -	198.
“ “ Moorshedabad. - - - -	24.
“ “ Monghyr. - - - -	40.
“ “ Netherlands. - - - -	176-188.
“ “ Norway. - - - -	82-191.
“ “ Nuddea. - - - -	27.
“ “ Orissá. - - - -	39.
“ “ Oudh. - - - -	15.
“ “ Pallipor Lazaretto. - - - -	52.
“ “ Patna. - - - -	39.
“ “ Peters, treatment in India. - - - -	66.
“ “ Poona. Sassoon Infirm Asylum. - - - -	53.
“ “ Poor Houses, and Asylums. India. - - - -	60.

	PAGE
Reports from Purneah. - - - -	31.
“ “ Rajshahye. - - - -	28.
“ “ Ratnagiri Hospital. - - - -	52.
“ “ Rawalpindi Asylum. - - - -	64.
“ “ Rungpur. - - - -	32.
“ “ Ruthgora. - - - -	22.
“ “ Sabathu Asylum. - - - -	65.
“ “ Sandwich Islands. - - - -	218.
“ “ Sassoon Infirm Asylum. - - - -	53.
“ “ Savantvadi Hospital. - - - -	54.
“ “ Serampore. - - - -	20
“ “ Sialkot Asylum. - - - -	64.
“ “ Siam. - - - -	193.
“ “ Spain. - - - -	194.
“ “ Treatment of Leprosy in India. - - - -	66-81.
“ “ Treatment of Leprosy in Bankoora Jail. - - - -	78.
“ “ Trichinopoly. Leper Hospital. - - - -	51.
“ “ Umballa Asylum. - - - -	61.
Sabathu Asylum. - - - -	65.
Sandwich Islands. - - - -	209, 218, 220.
Sassoon Infirm Asylum. - - - -	53.
Savantvadi Hospital. - - - -	54.
Sein. Gurbetta. - - - -	23.
Serampore. Greene. - - - -	20.
Shircore. Moorshedabad. - - - -	24.
Sialkot Asylum. - - - -	64.
Siam. Kurtzhalss. - - - -	193.
Smith A. C. Canada. - - - -	154.
Spain. Faculty of Barcelona. - - - -	194.
Stewart. Cuttack. - - - -	37.
Thompson. Madras Leper Hospital. - - - -	50.
Tracadie. Graham. - - - -	157.
“ Smith. - - - -	154.
“ Taché. - - - -	135.
Treatment of Leprosy. India. - - - -	66-81.
Trichinopoly Hospital, Canney. - - - -	51.
Torrens. Canary Islands. - - - -	158.
Umballa Asylum. - - - -	61.

	PAGE
Valladores. Guatemala. - - -	173.
Webber. Duiagepur. - - -	34.
White. Contagion of Leprosy. - - -	219.
Wright. Jessore. - - -	35.
Yamamoto Dr. K. Japan. - - -	217.
Zaheerudeen. Barrh. - - -	40.





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